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T.M.



RESEARCH DATA:

Color schemes for a Battle of Britain Supermarine Spitfire Mk. IA . . . from manufacturer to museum



How to make clear acrylic display cases
Modeling the Soviet T-60 scout tank
in 1/35 scale

Formula 1 race car cockpit detailing



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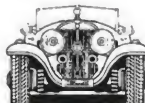
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ON THE COVER

Ken Sommerfield's detailed painting of Supermarine Spitfire Mk. IA P9306 is but one of 11 full-color 1/48 scale views of this Battle of Britain warbird in this issue. Ken's article begins on page 52. The superdetailed 1/12 scale Formula 1 car is by Paul Budzik (page 38), and Dennis Moore built the Heller 1/400 scale *Dunkerque*—and the clear plexiglass display case (page 34). Photos by Paul Budzik and FSM Staff Photographer A. L. Schmidt.



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Modeling the Soviet T-60 scout tank in 1/35 scale — 22

STEVE ZALOGA

An ideal vehicle for your first scratchbuilding project

Modeling a mountain man in the 20th century — 29

BILL TILTON

Step-by-step techniques for painting and adding realistic buckskin texture to a 90 mm figure

How to make clear acrylic display cases — 34

DENNIS MOORE

Protecting and preserving your models with plexiglass

Formula 1 race car cockpit detailing — 38

PAUL BUDZIK

The techniques are every bit as applicable to aircraft

Building your first diorama — 45

BRUCE CULVER

Basic techniques you can use to construct an attractive scene in just two or three evenings

Research data: Supermarine Spitfire Mk. IA P9306 — 52

KEN SOMMERFIELD

Color schemes and markings for a Battle of Britain warbird from manufacturer to museum

DEPARTMENTS

Update — 4

Reader Forum — 8

Workbench Reviews — 11

FSM Looks at New Products — 18

From the Editor — 21

Book Briefs — 62

Tips and Techniques — 68

Index to Advertisers — 74

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FSM UPDATE

FSM invites manufacturers and publishers to submit news releases, photos, product samples, and new catalogs. Send all material to FSM Update, FINESCALE MODELER, 1027 North Seventh Street, Milwaukee, WI 53233.

Kit releases. Combat Models, 1633 Marconi Road, Wall, NJ 07719, has announced four new vacuum-formed kits: 1/48 scale B-58 Hustler, and 1/32 scale SBC-3 or 4 Helldiver, Curtiss P-6E Hawk, and Brewster Buffalo. Die-cast metal parts will be included. Combat Models also plans to add die-cast landing gear to some of its older releases: F-101, F-105, A-7, F-8, and F-100.

Koster Aero Enterprises, 233 East Ellis Avenue, Libertyville, IL 60048, offers a new 1/48 scale conversion kit: Kit No. 3 contains 16 vacuum-formed parts and 8 injection-molded parts to convert a Monogram P-51B to a P-51A and A-36; decals are included. Koster also has announced kits 4 and 5. Number 4 will contain 9 vacuum-formed parts, including 5 clear parts, to convert either Revell's or Monogram's B-17 to a B-17C or B-17D. Kit No. 5, a 1/48 scale vacuum-formed multiple-version kit of the Junkers Ju 88A, G, S, and T, will have 80 vacuum-formed parts, including 11 clear parts and 42 injection-molded parts to build most versions of the Ju 88A-4 and 5, G, S, and T (bomber, recon, and nightfighter, both Jumo and BMW engines). Both kits 4 and 5 will include decals.

Model Rectifier Corporation, 2500 Woodbridge Avenue, P. O. Box 267, Edison, NJ 08817, has added the following Tamiya kits to its 1/24 scale sports car series: No. SS2421, Toyota Celica XX2800 GT, \$10.98; SS2422, Nissan Skyline 2000 Turbo GTE-S, \$11.98; SS2425, Nissan Skyline hardtop 2000 turbo, \$11.50; SS2426, Honda City R with Motocompo minibike, \$10.98; and SS2427, Renault 5 Turbo Rally, \$10.98. In its 1/12 scale motorcycle series are 1406,

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Honda CB750F, \$11.98; 1407, Honda CB900F2 Bold'or, \$11.98; 1408, Honda CB1100R, \$11.98; 1409, Suzuki RGB500

Team Gallina, \$10.98; and 1410, Suzuki Katana GSX1100S, \$10.98. In the 1/6 scale motorcycle series, releases are BS0620, Honda CB750F, \$74.98, and BS0622, Honda CB1100R, \$74.98. Recent releases in the 1/35 scale prehistoric world series are 6901, Triceratops Eurycephalus, \$6.98; 6902, Stegosaurus Stenops, \$6.98; and 6903, Tyrannosaurus Rex, \$7.98. Other Tamiya releases include MM224, 1/35 scale M1 Abrams



Main Battle Tank, \$17.98; MM223, 1/35 scale Ford Mutt M151A2, \$5.98; and MM201A, 1/35 scale German Flakpanzer IV Möbelwagen, \$9.98.

Revell, Inc., 4223 Glencoe Avenue, Venice, CA 90291, has released the following kits from its "History Makers" series: No. 8604, 1/96 scale Tranquillity base, \$12.00; 8605, 1/96 scale Apollo/Saturn V, \$50.00; 8607, 1/292 scale U. S. S. *Burton Island*, \$9.00; 8610, 1/64 scale North American X-15, \$10.00; 8611, 1/32 scale Northrop Hawk, \$12.00; 8613, 1/40 scale Nike Hercules, \$13.90; 8618, 1/24 scale Gemini space capsule, \$20.00; 8624, 1/400 scale U. S. S. *Mission Capistrano*, \$10.00; and 8625, 1/32 scale self-propelled howitzer M55m, \$24.00.

Decals. Krasel Industries, Inc., 1821 East Newport Circle, Santa Ana, CA 92705, announces the release of several sets of Microscale decals: No. 48-116, is for 1/48 scale aircraft, Navy FJ-3Ms, VF-173, VF-125; No. 48-117, for 1/48 scale aircraft, Navy FJ-3Ms, VF-33, VF-214; No. 72-332, for 1/72 scale aircraft, A-7B, VA-125, AW 12, A-7Bs, VA-303, AW 30, VA-305, AW 30; No. 72-333, for 1/72 scale aircraft, Carrier Air Wing 7, F-4J, VF-33, F-9F2, VF-72, A-7E AG 400 CAG; No. 72-334, for 1/72 scale aircraft, F-100C New Mexico ANG, F-100Ds Arkansas ANG, Ohio ANG; and No. 72-335, for 1/72 scale aircraft, A-10s 23TFW/74TFS, 354TFW/356TFS, 57TTW/66FWS, 47TFS AFRES, #5 Prod. AFTC and ANGs of New York, Massachusetts, Maryland, and Connecticut.

Paints and adhesives. M. Grumbacher, Inc., 460 West 34th Street, New York, NY 10001, has announced that its Tuffilm aerosol fixative is now available in gloss finish in 4 3/4- and 12 3/4-ounce sizes.

Metalizer Products, 1019 Bonita Street, Tustin, CA 92680, offers a new metallic finishing system called Metalizer. It comes pre-mixed and can be applied with any airbrush, according to the manufacturer. Send a stamped, self-addressed envelope for a descriptive brochure.

Smith Brothers Hobbies, 8941 Reseda Boulevard, Northridge, CA 91324, offers a new liquid masking material, Super Mask, and a new cement, Super Weld. Super Mask works on gloss surfaces, metal plating, metallized surfaces, and on canopies, but cannot be applied over flat (matte) painted surfaces, according to the manufacturer. A 2-ounce bottle of Super Mask is \$2.00. Super

Weld is a fast-drying cement that contains methylene chloride. The manufacturer says it will join acrylic to styrene quite well, with only a slight loss in drying time. A 2-ounce bottle sells for \$1.75.

Figures. Camlyn Marketing, 1640 Fifth Avenue, Santa Monica, CA 90401, is offering a Welsh-made chess set in which characters from *The Lord of the Rings* are used to represent the playing pieces. Each set is handmade. The standard set costs approxi-



mately \$150.00. A deluxe version in contrasting cold-cast bronze is also available for approximately \$450.00.

Imrie/Risley Miniatures, P. O. Box 89, Burnt Hills, NY 12027, announces the release of a 54 mm Santa Claus model (No. L-6) for \$6.95. Imrie/Risley Miniatures also offers a 54 mm Robin Hood grouping (L-1) for \$24.00. Individual figures in the Robin Hood grouping are available separately for \$5.95 each: L-2, Robin Hood; L-3, Will Scarlet; L-4, Little John; and L-5, Friar Tuck. The Robin Hood models can also be used with Imrie/Risley's King Arthur and Men-At-Arms series.

Accessories and diorama materials. Blue Ribbon Models, P. O. Box 888, Marblehead, MA 01945, sells hand-processed Maine woods lichen and seven colors of finely ground foam texture material for dioramas. Send a stamped, self-addressed envelope for descriptive literature.



Tools. Bowsprit, Inc., P. O. Box 130, Glencoe, IL 60022, sells La Guillotine, a desk-top miter shear used to cut small wood strips and moldings to exact lengths and angles. According to Bowsprit, La Guillotine is made of hard maple, has a stainless steel blade, is fully adjustable from 0 through 60 degrees, and can be set up for exact-length multiple cuts. It comes fully assembled with two extra blades; a package of five extra blades is \$1.90. The price of La Guillotine is \$28.50. Add \$1.50 for shipping via UPS, or \$3.50 if shipped to Canada or a United States post office box.

Dremel, P. O. Box 518, Racine, WI 53406, is offering a free bonus of a router attachment and 1/8" straight router bit with the purchase of its Model 3801SP Moto-Tool kit.

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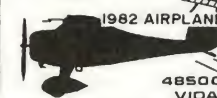
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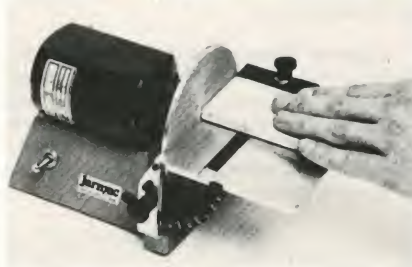
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The kit contains a Model 380 variable speed (5,000 to 28,000 rpm) ball bearing Moto-Tool; it comes in a double compartment carrying case with 40 accessories. The free offer has a retail value of \$20.30 and is scheduled to expire December 31, 1982.



General Hardware Manufacturing Co., Inc., 80 White Street, New York, NY 10013, imports from Switzerland a polypropylene plastic dial caliper (NS-142 med) with a 5" capacity that is suitable for inside, outside, depth, and step measurements. The dial is graduated in increments of .01" and $\frac{1}{64}$ "; it is adjustable for a zero reading. A drill and tap chart is printed on the back of the caliper. A plastic case is included. The tool is also available with metric dial readings (NS-143 mm). The price is \$12.50.

Jarmac, Inc., P. O. Box 2785, Springfield, IL 62708, has released a bench top table saw featuring a 9" x 12" tabletop. The distance between the front table edge and the saw blade is 4" to accommodate wider crosscuts, and rip cuts can be made up to 5" wide. A larger miter guide is also included. The saw has a 1/15 hp, 5,000 rpm motor. Jarmac also has released a 4" tilt-table disc sander. This



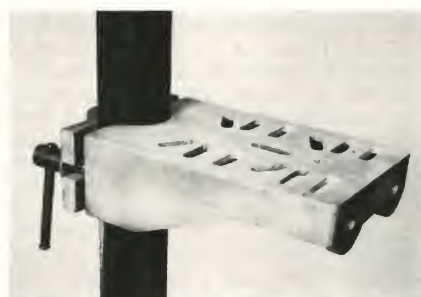
all-metal sander uses self-adhesive pads capable of sanding wood, metal, and plastic. The 4" x 5" table tilts up to 45 degrees. The sander has a 1/15 hp, 5,000 rpm motor and a Jarmac heavy-duty, 360-degree miter guide.



Maxon, P. O. Box 243, Carlstadt, NJ 07072, announces its new all-purpose tweezer set (No. H-521). The five tweezers in the set are a 6" retrieving tweezer, 6 1/2" self-closing tweezer, 6" curved solder-utility tweezer, 4 3/4" stamp tweezer, and a 4 1/2" splinter tweezer. No price is available.



Moody Tools, Inc., 42-60 Crompton Avenue, East Greenwich, RI 02818, recently introduced a four-piece pin vise set and four individual pin vises. The set contains pin vises in sizes .000"-.055", .025"-.075", .045"-.125", and .110"-.187". The four-piece set sells for \$27.25, while the individual pin vises range from \$5.90 to \$7.80. Moody Tools also offers a 100-piece miniature tool set (73-0199) for \$119.95. The set comes in a wooden box and features a comprehensive selection of miniature slotted and Phillips screwdrivers, hex drivers, open end and socket wrenches, and splines.



Versatile Improvement Products, Ltd., 4770 Harris Hill Road, Williamsville, NY 14221, has released the Versa-Table, which attaches with no tools to a basement support post and will securely hold almost any mountable tool. The six-pound unit is made of aircraft-specification aluminum and measures 3" x 6" x 9 1/4". It will mount on posts from 2 1/2" to 3 1/4" in diameter. The Versa-Table is available from the manufacturer at an introductory price of \$24.95; add \$5.00 for handling, shipping, and, where applicable, sales tax.

Catalogs. Aeroprint, 405 Monroe Street, Boonton, NJ 07005, offers a 32-page catalog of aviation art prints for \$1.00.

AIN Plastics, Inc., Department BAC-83, 249 East Sandford Boulevard, P. O. Box 151, Mount Vernon, NY 10550, has released its free 1983 catalog. The 128-page catalog

features items such as acrylics, polycarbonates, Teflon, nylon, Delrin, polyolefins, polyurethanes, and phenolics, plus cements and adhesives.

Albion Scott Ltd., Bercourt House, York Road, Brentford, Middlesex, TW8 0QP, England, offers the following catalogs: military and modeling books, aircraft and aviation, ships and maritime, railroads and model railroading, and cars. The catalogs are free with orders on request; otherwise send \$2.00.

Archer's Hobby World, 18230 Ward Street, Fountain Valley, CA 92708, offers its 20-page 1982-83 catalog for \$3.50. The catalog is updated throughout the year via Archer's newsletter and lists aircraft kits, automobile kits, decals, tools, and paints.

Artistic Airbrush, P. O. Box 3318, Portland, OR 97208, offers a free 1982-83 catalog. The 40-page catalog lists 67 airbrush models, as well as airbrush parts and support equipment, books on airbrushing, and graphic arts supplies.

Bliss Marine, Mail Order/Ship Model Division, Route 128 at Exit 61, Dedham, MA 02026, is offering its 1983 ship model catalog for free; it normally sells for \$2.00.

Brookstone Company, 127 Vose Farm Road, Peterborough, NH 03458, has released its free Fall 1982 catalog. The 68-page catalog offers, among other items, hard-to-find tools.

Classic Motorbooks, P. O. Box 1, Osceola, WI 54020, has released its 1983 catalog of automotive literature. The 120-page catalog costs \$2.00.

Grandt Line Products, Inc., 1040B Shary Court, Concord, CA 94518, offers an "augmentables" flyer for \$.50 plus a stamped, self-addressed envelope. The flyer lists detail parts designed for model railroaders, but which are also suitable for other purposes. Grandt Line says it is interested in suggestions from modelers for new "augmentables," as well as detail parts for aircraft and armor.

Historic Aviation, 3850 Coronation Road, Eagan, MN 55122, has released its 20-page early Fall 1982 catalog listing books of interest to aviation buffs. The catalog sells for \$1.00.

Model Expo Inc., 23 Just Road, Fairfield, NJ 07006, offers its 1982 catalog of historic ship model kits, books, tools, and adhesives. The 32-page catalog costs \$2.00.

The 76-page 1982 MRC-Tamiya catalog from Model Rectifier Corporation, 2500 Woodbridge Avenue, P. O. Box 267, Edison, NJ 08817, sells for \$2.00.

Revell, Inc. 4223 Glencoe Avenue, Venice, CA 90291, sells its 74-page 1982 catalog for \$3.00.

Starline Discount Hobbies, P. O. Box 38, Stanton, CA 90680, offers a catalog of airliner and civil aircraft kits and supplies for \$1.00.

Teka Fine Line Brushes, Inc., 3704 Bedford Avenue, Brooklyn, NY 11229, has a new 24-page catalog with more than 200 photographs and illustrations of brushes, tools, and modeling aids. The \$2.50 price of the catalog is refundable with your first order.

Zenith Aviation Books, P. O. Box 1, Osceola, WI 54020, offers its August 1982 catalog listing more than 300 books. The 30-page catalog is free.

Miscellaneous. Air Sea Graphic, 151 Clapboard Ridge Road, Danbury, CT 06810,

offers five full-color posters in its Classic Warbirds series. The 25" x 35" posters include technical data, historical information, and illustrations. Posters of the Boeing B-17, de Havilland Mosquito, Supermarine Spitfire, Messerschmitt Me 109, and North American P-51 Mustang are available for \$6.95 each plus \$2.80 shipping and handling; two or more prints are \$6.50 each plus \$5.00 shipping and handling. Also available as part of the Classic Warbirds series are black-and-white cutaway drawings of the de Havilland Mosquito, Me 109, North American P-51 Mustang, Supermarine Spitfire, Hawker Hurricane, Fw 190, and S.E.5A. The 17" x 23" drawings show the inner workings of the aircraft. The price is \$4.95 each plus \$2.40 shipping and handling, or two or more for \$4.25 plus \$4.00 shipping and handling. All posters and cutaway drawings are shipped in mailing tubes.

Airbrush World Magazine, P. O. Box 19357, Portland, OR 97219, is a new quarterly publication written "by and for airbrushers." The 32-page magazine contains technique-oriented articles and columns and reviews of books, equipment, and exhibitions. Subscriptions cost \$17.50 per year, and it is also sold at art stores and hobby shops.

Americal/Gryphon, 4373 Varsity Lane, Houston, TX 77004, sells Albatros trademark T-shirts. The trademark is printed in four colors; the shirts are available for \$9.00 in small, medium, large, and extra large. Add \$1.25 for shipping and handling for the first shirt and \$.75 for each additional shirt.

Fantasy Modeling magazine, published by Fantasy Modeling Inc., 475 Park Avenue South, New York, NY 10016, has announced that it is temporarily suspending publication. The publisher says it will make a final decision concerning the magazine in the next few months and will notify all subscribers at that time.


Model & Allied Publications, Ltd., P. O. Box 35, Bridge Street, Hemel Hempstead, Herts., HP1 1EE, England, announces the release of *Aircraft from the Battle of Britain*, an 80-page, single-issue magazine featuring color profiles, scale drawings, cutaways, and modeling tips about the Spitfire, Hurricane, Beaufighter, Blenheim, Gladiator, Defiant, Me 109, Me 110, Stuka, Ju 88, He 111, and Do 17Z. Each type is shown in 1/72 scale. Model & Allied Publications also is publishing a new quarterly magazine, *New Voyager*. The Autumn 1982 issue contains 84 pages, including 16 in color, on topics such as science fiction/fantasy films, astronomy, science, and science fiction.

Scalecraft, P. O. Box 4231, Whittier, CA 90607, offers an Me 262A camouflage drawing. The 17" x 22" drawing (available folded only) comes with 3 8 1/2" x 11" sheets of stencil information for \$3.00. According to Scalecraft, the drawing shows the splinter pattern camouflage scheme and official sizes and locations of national markings as applied to factory painted aircraft.

Trashbashers Interplanetary, c/o Harold McPherson, 3872 Clover Hill Drive, Bartlett, TN 38134, is offering a free copy of *TRASHnews* upon receipt of a stamped, self-addressed envelope. *TRASHnews* provides a humorous look at modeling.

Wings of Heritage, P. O. Box 9, St. George, UT 84770, sells plans for homebuilt aircraft. Although the plans are actually for flying scale models, they should also be suitable for display models.

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FSM READER FORUM

Let us know what you think! Comments, suggestions, corrections, and additional information on FSM articles are welcome in this column. Letters submitted for publication should be clearly marked "To the Editor" on both the envelope and the letter, should be typed or hand-printed, and should be no more than 300 words long.

A 1/12 scale racing helmet, anyone? Somewhere on this vast planet (terra firma) there must be a company that puts out a 1/12 scale Formula 1 racing helmet. I have collected all the Tamiya 1/12 scale kits, but alas, they don't have a helmet!

Thanks!

Sean Tellez
Olympia, Wash.

Decal advice from an expert. I call your attention to the kit review of the Minicraft SR-71 in the Fall 1982 issue of FSM. The discussion about the "bluish film" on the decal is unfortunate and will mislead any modeler who attempts to remove the "film." At this point, let me state that Microscale decals do indeed require a solvent to assure proper adhesion. This is because the adhesive on the paper is not really sufficient to stick to the model, and even with the solvent will not permanently stick to an unpainted surface, such as metal foil, clear windows, chrome plating, or unpainted plastic.

The major problem with American decals is the fact that the air pollution organizations in the U. S. will not allow the manufacture of a decal paper with a good adhesive because doing so creates air pollution. On the other hand, the paper imported from England by Briton's has an outstanding adhesive, and it is this that appears as a bluish haze when the decal film is wet. The inks used on Scale-Master decals, and any other American-made decal, are the same, purchased from the same

companies. However, the adhesive used on Briton's paper (called Decafix) is designed specifically for application to plastic kits. The bluish adhesive turns invisible when the decal dries, but while it is drying it becomes sensitive to the pressure between the decal and the model surface, setting up within five minutes to avoid moving around on the model. This reaction causes the decal to suck right down onto the surface.

Now, if the adhesive is washed off, as suggested in the review, the decal will never adhere to the model. The two solutions used in the Micro system [Micro Set and Micro Sol] will soften the decal film, allowing it to conform to the model, but neither solution has any adhesive properties; nothing will hold the decal to the model if only the solutions are used.

The review implies that the cloudy appearance will remain after the decal has dried. This is not true. I don't know the reviewer, Dennis Moore, but I think he's been influenced by others in the case of the decal film, because he obviously hasn't learned that the haze disappears upon drying. If everyone followed his advice [to wash the "bluish film" off the decals before application], the entire plastic industry in the U. S. would be in trouble, because Decafix decal paper is becoming the standard of the kit manufacturers.

I strongly recommend that modelers *not* wash the adhesive off their decals. If a Decafix decal doesn't adhere everywhere, the decal can be softened by applying plain denatured alcohol (about 98 cents a pint). The alcohol softens the film, but does nothing to the adhesive, which remains effective.

When the decal has been allowed to dry for at least 12 hours (30 minutes during a California heat wave!), the entire model should be wiped with a damp cloth to remove the excess cement (which will be invisible, but nonetheless there) to avoid a reaction with the paint. This may seem strange, but while adhesive under the decal does not harm the paint, adhesive resi-

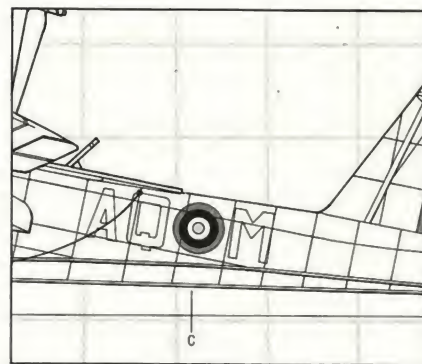
due left on the paint and exposed to air will cause the paint to turn brown and possibly craze the paint. This is true of all decal adhesives, not just Decafix.

Lloyd S. Jones
Scale-Master Decals
Costa Mesa, Calif.

Correction: Walrus markings. Naturally I was intrigued to see how my Walrus picture was used and especially to find that Roscoe Creed had chosen 276 Air Sea Rescue Squadron for his subject. The great regret is that he didn't research enough to sort out the colour and markings. He has split the Squadron ident letters which were "AQ," and has not emphasized the unique five-colour scheme. The 276 Squadron shared our own dispersal at Harrowbeer so I had a lot of connections with them, sufficient to know what should be right. Incidentally it is not correct to refer to the Walrus in an ASR capacity during the Battle of Britain. Nearly all of 276 Squadron was established long after 1940, to rescue bomber crews, particularly from daylight raids.

R. G. Moulton, Managing Director
Model Division
Model & Allied Publications
Hemel Hempstead, Herts., England

[Ron's right, of course, and here's how the markings on FSM's Supermarine Walrus drawings *should* have appeared. — B. H.]



More FSM Workbench Reviews. Just wanted to write, to give my opinion of your latest issue of FINESCALE MODELER. I am extremely pleased with the fact that you people are thoughtful enough to mail your magazines in an envelope, which protects the magazine, and eliminates the need to stick the address label on the cover. For this facet alone, I think you are to be commended. In regard to the contents of the issue, I was quite pleased with what I found. The articles are quite well done, informative, and clearly illustrated. I do wish, however, to make several suggestions in regard to future issues.

Firstly, I think your columns on kit

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reviews should be expanded. Too many times, I have seen people who were disappointed with kits that were given excellent reviews, but were not nearly as good, in fact, as the reviewer would have us believe, thus necessitating the need to make major renovations, additions, and conversions to the kit.

I would really love to see some good, honest kit reviews, good or bad, so at least the modeler knows in advance what he is spending a considerable amount of money on. I think this line of thought should be one of your priorities. Models are too expensive now to buy on reputation only. Each must be judged on its own merit, and either weather the criticism or enjoy the praise.

Secondly, I really think you should consider expanding the size of your issues, since you are not a monthly publication. You could go at least a dozen more pages, and not suffer the least for it.

I would also like to see a color center spread as a regular feature. Not on the more frequently seen aircraft, armor, ships, or figures, but on the lesser-seen ones that there is not much info available on. You could feature a different item each issue, such as an aircraft, tank, soft-skin, artillery piece, etc., giving a good selection of drawings in scale, and showing minute details that

are not found in other articles. For example, ever try to find a top shot of a Hanomag, or other open-top vehicle, showing the interior layout? It's next to impossible. Sure, the Panzers and other popular vehicles have plenty of good shots, but the lesser-known vehicles, that we try to scratchbuild, seem to have been lost to posterity.

These are the types of articles that are sorely needed in U. S. publications. Magazines featuring page after page of dioramas are nice for kids, as it gives them ideas to attempt, but I think your magazine should cater to a more sophisticated modeler, the ones who need the information to put the ideas together, and accurately. This is the kind of magazine I want. I see plenty of other modelers' work, firsthand, so I don't need to see pages of dioramas in magazines too!

I also like your idea of including addresses of suppliers in your articles. This makes it much easier to send away for info on products seen in your articles. And including the prices is another very helpful practice.

I am hoping your next issue is even better than this one. Keep up the good work, and keep your articles as honest as you possibly can. This, more than anything else, will make you a winner.

Dennis J. Sheehan
Sunnyside, N.Y.

A tip of the paint jar lid? My "cap" (a paint jar lid) is off to all the folks at FSM for a fine magazine. It is truly a modeler's magazine with the scale enthusiast in mind. A magazine of this caliber has been needed for a long time. I read the Fall Charter Issue from cover to cover.

Mr. Berton's "Fez Seller" was clear and to the point without excess photos or narration. I especially liked John Mahaffey and Jack Gurner's article on weathering older trucks, as 1/25 scale trucks are my forte. Now how about running an extension of your Tips and Techniques column with photos and remarks of projects from us not-so-well-known builders?

Keep up the fine scale work.

Paul Justy
Grafton, Ohio

[Take a look at this issue's Tips and Techniques, Paul, and see if it includes the variety of names you had in mind. FSM fully intends to publish lots of material from "not-so-well-known builders," because they do some of the finest work! Also, in the Spring issue we plan to introduce "FSM Showcase," which will be a one- or two-page spread intended to show off an unusual model without taking the space required to describe each and every step in its construction. — B. H.]

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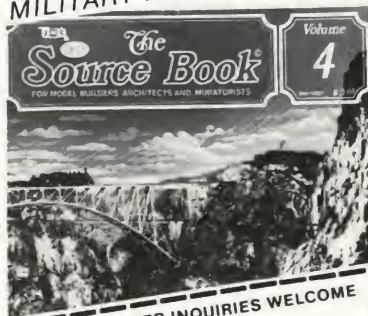
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Gloster E.28/39 Pioneer / Gloster Meteor

Heinkel He 162 / Lockheed P-80 Shooting Star

McDonnell FD-1 Phantom I / Messerschmitt Me 163 Komet

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Every FSM Workbench Review is a first-hand report by a modeler who has actually built the kit or used the product. While our reviewers are encouraged to compare the products to similar ones in their experience, evaluation is of secondary importance; the reviewer's primary goal is to provide a detailed description of the product so FSM readers can evaluate it for themselves. Models shown in Workbench Reviews are built straight from the box.

Kit: No. MM-220, U. S. M48A3 Patton tank

Scale: 1/35

Manufacturer: Tamiya, imported by Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817

Price: \$14.98.

THIS VIETNAM-ERA tank kit consists of 278 parts on five olive drab styrene and two polyvinyl sprues. Inspecting the parts before beginning construction, I found all of them well detailed. If anything, the polyvinyl tracks show greater detail than past Tamiya kits. The hull comes in two parts, upper and lower, and the turret also consists of two parts, the turret ring (lower) and the turret itself (upper). Many of the smaller details are separate parts instead of molded on, a big improvement over Tamiya kits of some years back.

The only areas I found lacking were the inside of the turret (which I feel should at least include a breech for the 90 mm gun, because the lack of it is visible through the commander's cu-



pola), the hatches (they should be operable), and the inside track detail where the track ends overlap to be joined (it's easy to hide). I also didn't like the slots in the hull intended to be used for motorizing the model, but these were easy to fill with sheet plastic and putty. Nothing was missing from the kit.

The only defect I found in the parts was some minor scratching on the clear plastic lens for the searchlight, in spite of the fact that the clear parts were packaged in a bag by themselves to prevent such damage. The scratches were shallow enough that I could have buffed them out, but I had planned to add a cover to the searchlight anyway. The white, yellow, and red decals come on a sheet that measures 2³/₈" x 4" and includes markings for both U. S. Army and Marine Corps versions.

There are six pages of instructions (five of them for assembly) on sheets measuring 6³/₄" x 10¹/₄". Construction is organized into 13 steps, most illustrated by perspective drawings. The

instructions include three photos of an assembled tank kit and plan and elevation drawings that show paint colors and decal placement. I found the instructions adequate. The box art is mainly there for decoration and is not useful for painting or decaling the finished model.

The kit went together with little or no difficulty. Other than removing some mold seams and filling a few mold marks I did not have to rework any of the parts to make them fit properly. With one very minor exception I followed the instructions exactly; simply for convenience, I added parts A13, A14, B20, and B21 to the hull before adding the suspension arms and road wheels. The kit did not include antennas, so I made two from stretched sprue. If I were to build this kit again, the only things I would do differently would be to substitute Micro Kristal-Kleer "glass" for the periscopes and headlights, make the hatches working, detail the inside surfaces of the hatches, and make a mantlet cover from tissue.

I had little reference material available in my library on the M48A3, but the kit appears well-scaled and the proportions coincide with the photos I checked.

I liked the kit, and rate it above average compared to other tank kits I have built. A person with a couple of years of modeling experience should be able to build it into an attractive model. I spent a total of 38 hours building my model — 20 hours for construction and 18 hours for painting. *Glenn Kreinus*

Kit: Douglas A2D-1 Skyhawk

Scale: 1/72

Manufacturer: RAREplanes, 69 Redstone Hill, Surrey, England

Price: \$8.00, including postage from England.

THIS VACUUM-FORMED kit consists of 26 parts embossed on a single sheet of .040" white plastic, two canopy

parts vacuum-formed from .025" clear plastic, and 15 injection-molded parts on a single sprue. The injection-molded parts are a feature of recent RAREplanes kits. No decals are included.

The vacuum-formed parts are excellent, featuring sharp edges, fine panel lines, and a minimum of molding pips. The canopy is good, but the headrest molded with it is not usable due to poor

fit. The injection-molded parts are good to average on one side only — the other side is flat. Although the kit is complete by vacuum-formed standards, numerous details must be scratchbuilt.

The four pages of instructions measure 7¹/₂" x 9" and provide only a general approach to building the model; there are no step-by-step directions. There is one photo of a completed

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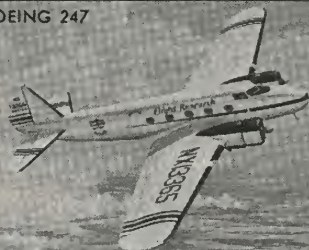
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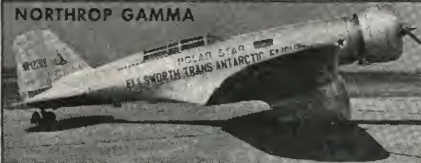
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model, and the instructions also include a good 1/72 scale three-view drawing, an exploded view, and a list of reference material.

The fit of the fuselage halves is good, but the wing-to-fuselage joints require considerable filling. I found that the forward section of the fuselage under the canopy required minor reshaping to achieve a good fit for the canopy. I also found that the method suggested for installing the spinner assembly resulted in the rear spinner having a loose fit. I glued both spinner assemblies together and installed the entire unit into a clay block placed in the nose before assembling the fuselage halves.

Close inspection of Douglas plans and various photographs indicated that the engine air intakes were too shallow. After cutting away the inner intake walls, I formed new, deeper intakes from Bondo putty by casting the Bondo around a clay plug, then removing the plug. I used Green Stuff to fair the intakes into the fuselage.

As with most vacuum-formed kits, achieving scale-thickness trailing edges is a problem. After thinning the inside areas of the parts as much as I dared, I assembled the wing and horizontal stabilizers, then filed the trailing edges to the desired thicknesses. Where necessary I re-scribed panel lines.

The kit provides two wing-mounted external fuel tanks and pylon parts for a centerline tank. Using one of the kit tanks as a pattern, I made a centerline tank from laminated styrene sheet.

I discarded the injection-molded landing gears, substituting new ones made from bent paper clip wire wrapped with strips of paper. I used the cast main wheels but discarded the separate tail wheel, using instead the wheel that is molded into the fuselage halves. I discarded the kit's rocket racks because they were oversize and crude, and scratchbuilt new ones. I also added clear wing navigation lights. Straight pins were used for guns and pitot tubes, thread for brake lines.

The decals I used included an old Authentic sheet (No. 6, National Insignias), "Navy" from an old "Aircraft in Review" sheet, and Microscale sheet RH-70 (railroad lettering).

A check of the overall dimensions of the completed model against a set of plans obtained from Douglas indicates that the kit is virtually right on the money: The largest overall error is in the fuselage, which is a scale 4" too short — about .05" off in 1/72 scale. The most serious error I found was a difference in height between the two engine exhaust openings of 1/16" (the port duct is higher; they should be at the same height on both sides). I did not fix this because my fuselage assembly was already complete when I discovered the error. Were I to build this model again, I would correct the problem by cutting



out the higher exhaust as a complete panel, then re-installing it in a lower position and filling the resulting gap.

The finished model is an attractive addition to any collection of post-WWII aircraft. I particularly liked the unusual subject matter, the molded propeller blades and wheels, the good plans, and the overall high quality of the vacuum-formed parts. My biggest complaints were the misaligned exhaust ducts and poor rocket racks and other flat-sided castings. I spent 30 to 40 hours building this kit, about right for a good-quality vacuum-formed kit



of this size. I would not hesitate to recommend the kit to any builder who has considerable experience with vacuum-formed models. *E. R. Staszak*



Both photos, Wayne E. Moyer

Kit: Goldenrod land speed record car
Scale: 1/43

Manufacturer: Mayes Models, available from Valley Plaza Hobbies, 12160 Hamlin St., North Hollywood, CA 91606

Price: \$45.00.

THIS UNUSUAL machine, powered by four 426 cu. in. Chrysler Hemi V-8s, was used in 1965 to establish the world land speed record for wheel-driven vehicles, a record which still stands. The 32'-long, four-ton "Goldenrod" was built by the Summers brothers of Ontario, California.

The kit consists of 20 cast white metal parts on one tree, rubber tires, and a vacuum-formed plastic windshield. The model has a one-piece body

shell (a very large part, considering the centrifugal casting method used to make it), a one-piece belly pan and chassis, and a seat, instrument panel, and steering wheel. Optional long and short intake ducts fit into the body shell from inside. The quality of the parts is excellent, and the level of detail is average—there are small mold lines along the bottom of the body shell and around the belly pan. The kit includes a 2" x 6" decal sheet.

The two pages of written material are only general instructions, not step-by-step assembly and finishing procedures. One sheet provides a large exploded view that shows how the major parts are to be assembled and where the decals are to be placed. The data sheet furnishes historical background

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on the vehicle and lists dimensions and specifications.

This is an easy kit. I checked the fit of all parts, painted everything before assembly, inserted the air intakes, fitted the interior parts, and dropped the body onto the chassis. I did not encounter any problems, except that my kit was missing two wheels, which were quickly replaced by the dealer that I bought the kit from.

All of the cast parts fit well. The vacuum-formed clear windshield re-

quires careful trim-and-check work to cut to size without going too small.

The finished model checks out well against the dimensions given on the data sheet, although it is approximately .12" too short overall. This scales out to approximately 1/43.7 scale versus the correct 1/43.5 (1/43 scale is actually 7 mm = 1", 1/43.5 scale). The wheelbase is .08" short, also 1/43.7, and the track is a shade narrow, which is unavoidable because of body sidewall thickness.

If I were to build this kit again the only change I would make would be to drill out the exhaust stacks. I might also consider opening the cockpit hatch, but I probably wouldn't because the gap would be out of scale and the model actually looks better buttoned up.

Overall, this is a fine kit that is accurately made and "looks right" when finished, and I recommend it. It took me 6 hours to build; most metal cars I've built run 8-10 hours.

Wayne E. Moyer

Kit: No. 17, Avia B.21

Scale: 1/72

Manufacturer: K.P. (Kovozavody Prostejov, Czechoslovakia)

Price: \$6.00.

EACH NEW RELEASE from K.P. shows some small amount of improvement, and their new Avia B.21 is one of the best Communist-block kits I've built. The K.P. line includes some exotic Czech and Soviet birds that should not be overlooked by avid modelers.

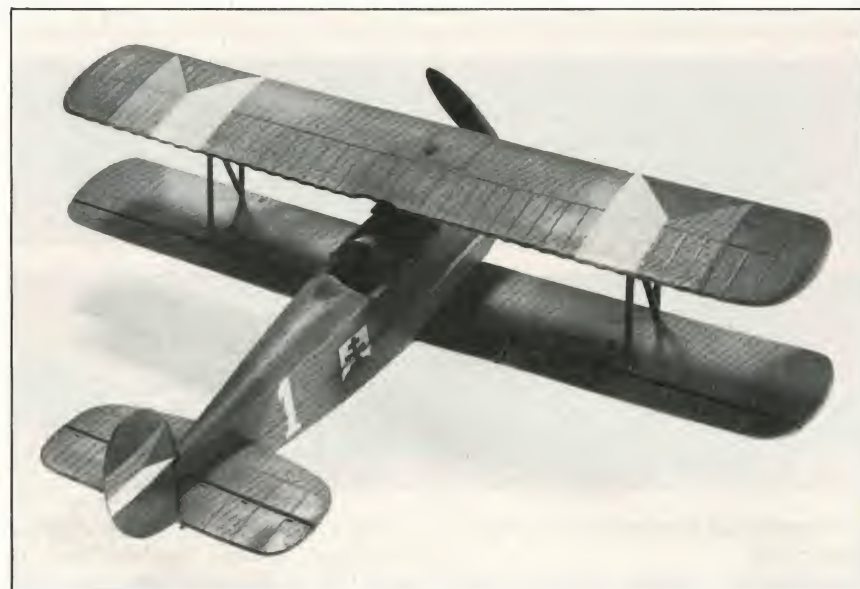
This kit is made of light gray styrene of average hardness. There are 33 parts on 3 trees. The 3½" x 5" decal sheet is printed in red, white, blue, and black and includes schemes for four planes. The detailed painting and decaling instructions are in English, German, and Czechoslovakian.

The B.21 kit has the usual biplane breakdown, and I found the parts to be above average. The level of detail is excellent for an Eastern European kit, comparable to the molding quality of a Frog or Airfix kit of a few years ago. The quality of the clear parts is fair.

The 12" x 14" instruction sheet is printed on both sides, but includes no step-by-step directions or photos. There are drawings that show the parts sprues and two good exploded views of assembly, but the bulk of the written directions are given over to history and color scheme information. The box art is quite good and shows all four planes you can make using the kit decals.

Nothing was missing from my kit, and the model went together as shown in the drawings. There were gaps between the lower wing and the fuselage and the top of the cowl and fuselage, and I filled these with Duratite Plastic Putty. I also used Duratite to fill the seam between the propeller bushing (No. 5a) and the fuselage. I filled a small gap between the horizontal stabilizer (No. 14) and the fuselage by painting Elmer's Glue-All into the seam. I left the guns and exhaust pipes off until the lower wing and cowl assemblies were finished to prevent breakage. The fit of the struts—often a problem area with biplanes—was excellent, and the decals worked well.

No material is provided for rigging, and my model shown in the photos does



not include any. However, the plane should be rigged, and I plan to add stretched sprue wires to mine. If I built another one of these I would also add seat belts. The radiator has a large sink mark on it, and I suggest using a piece of brass drain mesh as a new grille.

The model is right on scale, but I think that in translating or printing the instructions the listings for the upper and lower wing lengths were reversed. The drawings clearly show the lower wing as being longer, and the spans listed for the lower wing match the upper on the model and vice versa.

Drawings in the Arco-Aircam book, *Czechoslovakian Air Force 1918-1970*, also show a longer lower wing. As for scale thicknesses, a few parts are a bit heavier than they should be.

I liked this kit because it went together well and because of its rare subject; it is an injection-molded model of a plane that might not even rate the attention of a vacuum-formed kit company in the West. The model is appropriate for an intermediate-level modeler, someone with a couple of years modeling experience, and the 11 hours I spent on it were about average compared with similar kits. Dennis Moore

Kit: No. 343, Saab A 32A or S 32C Lansen

Scale: 1/72

Manufacturer: Heller, imported by Polk's Model Craft Hobbies, Inc., 346 Bergen Ave., Jersey City, NJ 07304

Price: \$10.95.

FIRST PLACED IN SERVICE late in 1955, the Saab 32 Lansen was the first Swedish aircraft to break the sound barrier. Over the next seven years Saab produced 450 Lansens in three major variants: the A 32A attack, the J 32B all-weather fighter, and the S 32C photo recon version. This Heller kit can be built as either an A 32A or an S 32C.

The kit is molded in silver-gray styrene and consists of 52 parts on four sprues. The breakdown of the model is fairly standard for aircraft: The fuselage is molded as two halves and the wings are molded in three pieces, with the completed wing subassembly fitting into the bottom of the fuselage. The underside of the nose for the C version is molded in clear plastic because of the camera windows.

The parts are of what I would consider average quality; their detail is good, but mold marks are somewhat heavy. Panel lines are raised and delicate. The clear parts are well done, but their attachment points to their sprue are much too thick. The canopy on my

kit included a prominent stress mark at the point of attachment. The scale thicknesses of parts, especially where they are exposed edge-on, are okay.

There are four pages of instructions on two sheets, measuring 12" x 16" and 8" x 12". The assembly directions are organized into seven steps illustrated with exploded-view drawings, and there are two versions of Step 5 depending on which variant of the plane you are building. There are no photos and no written assembly sequence — symbols and arrows are used to overcome the language barrier.

The instructions include two sets of three-view drawings that show paint

schemes. These drawings include numbers that refer to a Heller paint list on the second instruction sheet, but only the last two of the four digits in the numbers match (I have found this system used on other recent Heller kits). A short history of the plane is provided in four languages.

The box art shows both color schemes in color and is helpful, except that the national markings shown on the A version are bordered in orange on the box but are yellow on the decal sheet. The decal sheet measures 3" x 4" and is printed in blue, yellow, red, and black. The decals are thin and have little film.

The kit builds into a handsome model,



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but it doesn't build itself. I chose to build the S 32C photo recon version, and the fit on most of the parts was good, except for the camera pack (unfortunately, its worst areas were in the air intake channels, just where it's hardest to work!). The canopy requires sanding on the bottom at the rear and some thinning on the inside in front and to the right of the pilot. The seats

must be sanded because of rough sides, and the sink holes in the headrests are so deep that they must be puttied. The fuselage air intakes are rough and must be sanded. The air intake fences did not fit well, so I painted Elmer's into the gaps. Parts 33 and 34 are so small that they can be sanded only with difficulty.

The only item I considered missing was a strange-looking radar dome or belly tank shown on the box art which wasn't included as a part of the kit. If you have an old Airfix Boomerang kit around, you might use its belly tank.

I painted the wings, fuselage, and horizontal stabilizers before gluing them together because the leading edges of the wings, tail, and horizontal stabilizers are silver. I used Liqu-a-plate for these surfaces and do not like to try to mask over it. Incidentally, a few years

ago a fellow modeler warned me that a vapor-honing process used to make some parts of the molds for Heller kits would cause terrible appearance problems with metallic paints. I was curious to see if this was true, and if it was the case with the Lanser kit, so I tested some Liqu-a-plate aluminum on the unused nose panel for the A version of this plane (see small photo) and found no unusual pitting on the painted surface. I used the same paint on the exhaust pipe and on the leading edges of the wings and tail pieces with no ill effects, so as far as I'm concerned the warning can be dismissed as an old wives' tale.

I would have made several changes to the kit had I not been constrained to FSM's out-of-the-box review guidelines. First, I would drill out all of the camera pack windows before painting and replace them with Microscale Kristal-Kleer. I would also vacuum-form a new canopy to replace the flawed one mentioned above.

This is a good kit, but not the best Heller aircraft model I have built. I spent 16 hours working on it — two or three hours more than usual for a 1/72 scale jet — and it demands at least a couple of years' modeling experience. I would recommend this kit because of the unusual subject, but with the warning that the kit definitely does not build itself.

Dennis Moore



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FINESCALE MODELER staff photos
by A. L. Schmidt



Dusting kit

A weathering kit consisting of one bag each of beige, light gray, orange-brown, yellow-brown, and black soil ground to the consistency of talcum powder is available for \$8.95 from The Rock Quarry, 3008 Emerald Drive, Mesquite, TX 75150. The kit includes instructions on how to use the powders with Floquil stains and Dio-sol to weather wood, but the materials are suitable for weathering other types of models and dioramas as well.



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- X-1005. .032", 95% cadmium-5% silver, 640° F., \$3.50. Add \$.75 per order for postage.



Scale nuts and washers

Grandt Line Products, Inc., 1040B Shary Court, Concord, CA 94518, manufactures black plastic nut and washer sets that are cored to fit over .020" wire. The washers are 6 1/2" in diameter in 1/87 scale, and are useful as smaller fasteners in larger scales. The stock number is 5156; the price is \$1.25 per package.



Special-purpose adhesives

Pacer Technology & Resources, 1600 Dell Avenue, Campbell, CA 95008, has introduced Plasti-Zap/CA ++, a cyanoacrylate cement specially formulated for plastic kit assembly. Pacer claims that Plasti-Zap bonds both unpainted and painted plastic surfaces, is not affected by mold-release agents, and allows sufficient time to align parts. A 1/2-ounce bottle sells for \$2.98.

Zip-Kicker is an accelerator which may be sprayed or swabbed over surfaces to be bonded either before or after Plasti-Zap or another cyanoacrylate cement has been applied. Zip-Kicker is said to promote instant bonding and fillet forming even on large sections of plastic. It will not attack plastic but may dissolve some decals. A two-ounce bottle with a pump sprayer is \$4.98.

Z-7 Debonder is a water-based solvent for cyanoacrylate cements that can be used to remove cured adhesive

from skin (*not* eyes), furniture, clothing, and plastic parts. It does not attack hobby paints and wood stains, so may be used to highlight or weather painted surfaces. A one-ounce bottle costs \$3.25.

Pacer also offers Zap/CA (thin, instant setting), Zap-a-Gap/CA (thick, slower setting), and Slo-Zap (extra-thick, extra-slow setting) [not shown] cyanoacrylate cements. Zap/CA and Zap-a-Gap/CA are available in four sizes: 2 ounce, \$9.25; 1 ounce, \$4.79; 1/2 ounce, \$2.79; and 1/4 ounce, \$1.89. Slo-Zap/CA is sold in one-ounce containers for \$5.49.

The photo shows the cement bottles fitted with the Z-Ends dispensing tips provided with each container; packages of ten tips are available for \$1.49. Pacer claims the tips are specially treated to prevent clogging.



Oxygen hose

Aircraft oxygen hoses in 1/24, 1/32, and 1/48 scales (1/32 scale shown) are available from Waldron Model Products, 1358 Stephen Way, San Jose, CA 95129, for \$2.50 each plus 15 percent for postage and handling. Instructions for modeling an oxygen regulator are included.

Union and Confederate soldiers

Imrie/Risley Miniatures, Inc., P. O. Box 89, Burnt Hills, NY 12027 has released two sets of 54 mm (1/32 scale) cast-metal figures of the Civil War period. One set of four figures represents Union soldiers in foreign uniforms about 1861. They are (photo A, left to right):

- Kit C-86, 83rd Pennsylvania Volunteer Infantry Regiment, 1861-62.
- Kit C-87, 39th New York (Garibaldi Guards) Volunteer Infantry Regiment, 1861-62.
- Kit C-88, 69th (Fighting Irish) New York State Militia, 1861.
- Kit C-89, 79th (Cameron Highlanders) New York State Militia, 1861.

The second set represents Confederate soldiers in dress uniforms. They are (photo B, left to right):

- Kit C-90, a rifleman of the Alexandria Rifles, 6th Battalion Virginia Volunteers, 1860.
- Kit C-91, a rifleman of the Republic



can Blues, 1st Regiment, Georgia Volunteers, 1860.

• Kit C-92, a cavalryman of the 1st Virginia Cavalry Regiment, C. S. A., 1861-62.

• Kit C-93, a ranger of Terry's Texas Rangers (8th Texas Cavalry), C. S. A., 1861-64.

Each kit comes with painting instructions, a color reference card, and a brief history; each sells for \$5.95.



Brass investment castings

Cal-Scale, P. O. Box 475, Pinedale, CA 93650, has expanded its line of Combat Series 1/32 scale brass castings to include:

- CS-19, pioneer tank tools with brackets, \$4.95.
- CS-20, pioneer tools, \$4.95.
- CS-21, tank tools with brackets, \$4.75.
- CS-22, tank tools, \$4.75.
- CS-23, .30 caliber M1918A2 Browning automatic rifle, \$2.95.
- CS-24, 57 mm M-18 recoilless rifle, \$4.95.
- CS-25, .30 caliber M1918A6 air-cooled machine gun with stock and bipod, \$5.95.
- CS-26, two .50 caliber ammo boxes (lids closed), \$2.95.



- CS-27, three .30 caliber ammo boxes (two boxes with lids closed, one box with lid open), \$3.95.

Also available are kit No. 101, a .30 caliber air-cooled machine gun with tripod and ammo box, \$9.95; and kit No. 103, a 57 mm recoilless rifle with tripod, \$16.95.

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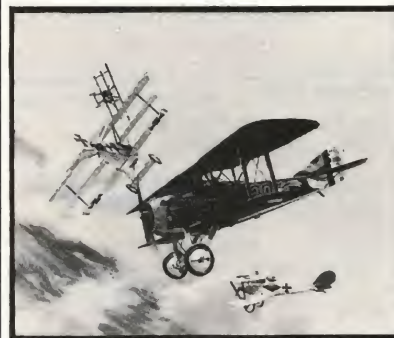
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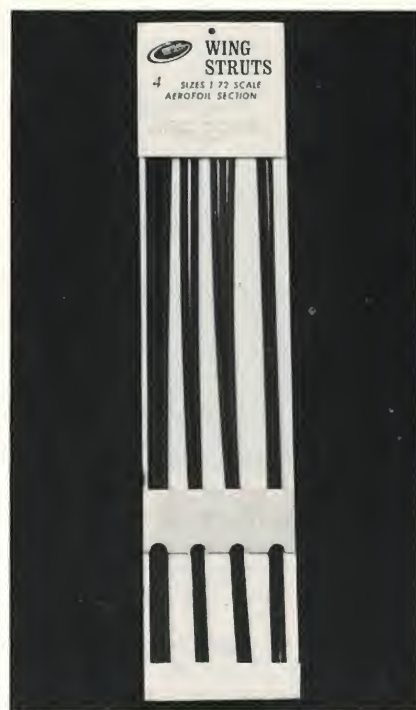
WWI German camouflage decals

Americals, 4373 Varsity Lane, Houston, TX 77004, manufactures 1/72 scale hand-printed, 8 1/4" x 10 3/4" decals for camouflage patterns used on WWI German airplanes and airships. Each sheet costs \$5.00, plus \$.50 postage and handling for three sheets.

The sets are:

- No. 1, Kriegsmarine camouflage, 1917-18.
- No. 2, Nachtbombengeschwader camouflage, 1916-18 (I).
- No. 3, Nachtbombengeschwader camouflage, 1917-18 (II).
- No. 4, Nachtbombengeschwader camouflage, 1917-18 (III).
- No. 5, Five-color lozenge camouflage, 1917-18 (top).
- No. 6, Five-color lozenge camouflage, 1917-18 (bottom).

An instruction sheet explaining the history of the camouflage pattern accompanies each sheet.



Wing struts

Dabar Depot, 13407 Wales Creek Road, South Wales, NY 14139, imports 1/72 scale strut stock made by Sutcliffe Productions of England. Each package contains ten 12" pieces of dark gray styrene ranging in width from about 1/16" to 1/4". The price is \$2.50 plus \$.50 postage and handling.



Woodburning tool

A small, lightweight woodburning tool suitable for plastic sculpting and cutting and accessories manufactured by Hot Tools Inc., Marblehead, Mass., are available from Santos Miniatures, P. O. Box 4062, Lakewood Drive, Harrisburg, PA 17111. Included are:

- WB-1 Hot Tool with a standard wedge-shaped tip, \$15.95. The Hot Tool is UL listed and draws 20 watts at 120 volts. It features a wooden handle and comes with a 5' 6" cord and a two-prong 120-volt AC plug.

- WB-2 Dial-Temp, an adjustable temperature regulator with a three-prong 120-volt AC plug, \$27.50.
- ST-1 wire stand, \$3.50.
- Standard tip, \$2.65.
- Blank tip (which can be ground to any shape), \$2.65.
- Extra-long blank tip, \$2.65.
- No. 8-X needle tip, \$2.65.
- 1/16" circle tip, \$2.65.
- 1/8" circle tip, \$2.65.
- 3/16" circle tip, \$2.65.
- 1/16" round tip, \$2.65.
- 1/8" round tip, \$2.65.
- 3/16" round tip, \$2.65.



FROM THE EDITOR

The romance of research

THERE'S A SIREN SONG that lures every one of us away from the workbench from time to time, often for fairly long periods. It's an activity as related to modeling as brother to brother, and it contributes as much to fine modeling as any new modeling material, paint, or technique. Although it can take many forms, is immensely pleasurable, and can be quite complex, the activity is called, simply, "research."

Why so? Why, if building models is really what this hobby is all about, do so many of us spend so much time with book in lap instead of modeling knife in hand? I think I know the answer, and it isn't something noble or heroic like "the unending human quest for knowledge." No, the reason that research is as much a part of modeling as cutting, gluing, or painting is that learning about the subject of a model makes building it more enjoyable, and, in many cases, more challenging.

Research doesn't just mean counting rivets and checking wingspans. Knowing who flew the aircraft or drove the car, where the tank fought, or what fleet the ship served with adds a dimension to modeling that few non-modelers can appreciate. Thoroughly researching a modeling subject can even establish a special relationship between it and the modeler.

This issue includes an excellent case in point. As Ken Sommerfield dug deeper and deeper into the background of the Spitfire that hangs, puppet-like, from the ceiling of Chicago's Museum of Science and Industry, he developed a kinship for the plane. Ken's curiosity extended far beyond wondering about the Spitfire's missing unit markings, or why it carried fishtail exhaust manifolds; he wanted to know the stories behind the five kill markings, who flew the plane, and how it had come to be in the museum at all. As his research uncovered the answers to those questions the plane slowly assumed the role of an old friend, one Ken isn't likely to forget. His article begins on page 52.

I hope Ken's story will intrigue you as much as it did me, and I hope at least some of you will find his data useful for building your own model of Spitfire P9306. Research is, after all, a most important tool in our arsenal of modeling techniques.

Bob Hays

Editor

FineScale
MODELER

NEXT ISSUE

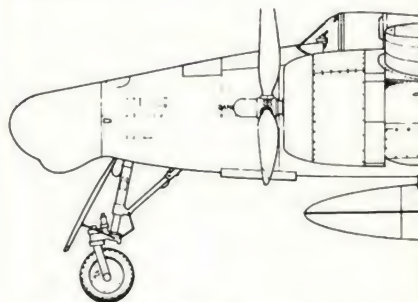
FEATURES



B-29 Superfortress in 1/72 scale. Phil Hays photo.

In Spring FINESCALE MODELER, the B-29 Superfortress "Eddie Allen" is the subject of an extraordinary 1/72 scale model. Phil Hays describes his techniques for removing rivets and other raised details, re-scribing panel lines, and achieving a realistic natural-metal finish. Bob Letterman's lifelike 4 x 8 foot 1/35 scale diorama, titled "The Winds of War," portrays a German town on the eve of World War Two. It's a highly unusual—and challenging—modeling project, and FINESCALE MODELER's interview with Bob offers highly interesting reading.

DATA/DRAWINGS




Grumman F7F-3N Tigercat. Drawings by W. Koster.

FSM will feature scale drawings and detail photos of Grumman's F7F-3N Tigercat, plus particulars on building four different versions of the aircraft from Aoshima and Monogram 1/72 scale kits.

**ALL IN
SPRING
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Modeling the Soviet T-60 scout tank in 1/35 scale

An ideal vehicle for your first scratchbuilding project



A T-60 in combat in 1943. Note that the radiator grille has been covered (a common practice in winter) with thin sheet metal, which has started to fall off. The tactical markings on this vehicle would make interesting additions to a model.

Author's collection

BY STEVE ZALOGA

SCRATCHBUILDING armor models isn't difficult; in fact, if you've used sheet plastic to make parts for conversion projects, you're already familiar with most of the techniques you'll need. In response to my article on the M1 Abrams in the Spring 1982 FSM several readers asked for a simpler, 1/35 scale project with full-size templates for the parts. After considering possible candidates such as the British Cromwell Mk. VI light tank and the Belgian T.15, I settled on the diminutive Soviet T-60.

The T-60 scout tank served in Soviet tank brigades in 1942 and 1943. Lightly armed and armored, it carried a two-man crew. There were two main production batches of the T-60, the early type with spoked wheels that I modeled, and a later version with solid disc wheels and thicker turret armor. Either makes an interesting counterpart for a model of the contemporary T-34, if only for the noticeable disparity in size.

Finding appropriate kit parts. Before starting any scratchbuilding proj-

ect, look around for kit parts you can use, especially suspension parts. For this model I tried to find kit parts for the wheels and track which would fit the vehicle without requiring major modifications. Road wheels from either the Tamiya British Universal Carrier Mk. II (kit No. MM-189) or the Italeri PzKpfw IB (kit No. 804) could be used, though I strongly prefer those from the

Universal Carrier. The T-60 requires 10 road wheels, while the Tamiya Universal Carrier kit contains only 9. If you have a second kit handy, the spare road wheel can be taken without totally spoiling the second kit.

The drive sprocket from the Universal Carrier is also readily adaptable to the T-60 even if some of the details are not quite right. For the small return



Figs. 1 and 2. (Left) The first stage of the turret subassembly consists of the octagonal base and four inner formers. (Right) The same subassembly after adding the keyhole-shaped turret roof and three of the slanted turret side panels.



(Above and below) Author Zaloga's T-60 is a tiny armor model even in 1/35 scale; it's just over 2" tall and only 4½" long. It represents a tank of the 61st Light Tank Brigade in 1942-43.

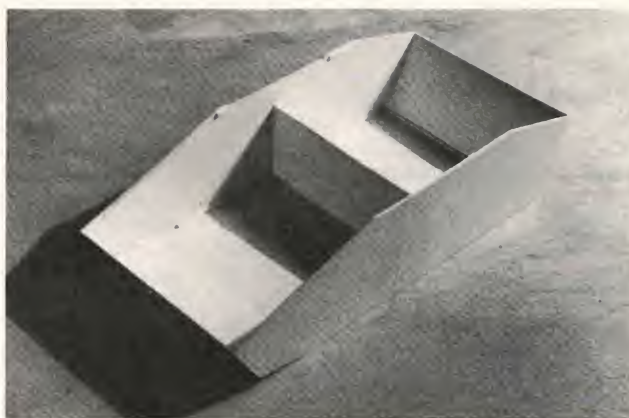


Fig. 4. The basic, boxlike hull assembly. All parts are cut from .020" styrene sheet. Note the use of bracing strips in the interior corners to align and reinforce the joints.

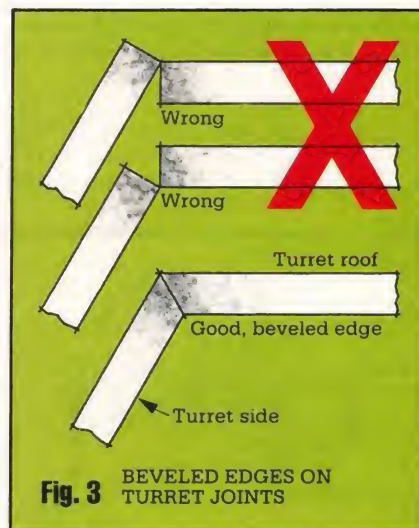


Fig. 3 BEVELED EDGES ON TURRET JOINTS

rollers I used road wheels from the Fujimi Sherman, but many other kit wheels or rollers would be just as appropriate. The tracks are from the Italeri PzKpfw IB kit mentioned above.

Aside from kit parts, you will need tools, liquid cement, and an ample supply of sheet plastic. Unless otherwise noted, the parts on my model were cut from .020" sheet styrene. Don't try to substitute tube-type plastic cement for the liquid, even if you use tube cement for kits. In order to allow decent clean-up of gaps and edges, sheet plastic must be assembled with liquid cement.

Starting with the turret. The turret on this model is undoubtedly the most difficult subassembly to build, and if you can handle this, the rest of the project should be a breeze. By the way, the Germans used a few captured T-60s as artillery tractors, minus the turret. If you have trouble with the turret, consider building the hull and running gear to make an attractive and unique towing vehicle for an Italeri or Tamiya 75 mm Pak 40 or similar weapon.

Start by transferring the full-size template shapes (page 26) to plastic. Use a

pin to poke tiny dots through the paper and into the plastic at the corners of each piece. Then, using a metal ruler and a razor blade, connect the dots and cut the pieces out.

I prefer to cut the pieces completely free from the plastic sheet rather than simply scoring the plastic and breaking the pieces free as many modelers do. Cutting all the way through results in cleaner edges. Incidentally, throughout this article the numbers in parentheses refer to the part numbers on the template on page 26.

Begin the turret by assembling the base (1), the internal formers (3, 4, 5), and the turret roof (2). The dotted lines on the turret base show where the internal formers go. If you like, add another part (3) to the assembly as I did to strengthen the internal formers, Fig. 1.

The next step is to add the turret side and back panels (6, 7, 8), Fig. 2. Bevel the edge of the pieces where they come into contact with one another at any angle other than 90 degrees. This can be done with a fine file or by scraping with the edge of a sharp modeling knife. The edges that are critical in this re-

spect are those that contact the turret roof edge, Fig. 3. Don't bother to bevel the edges that meet the turret base; they are completely hidden on the finished model.

Next add part (9) to the front edge of

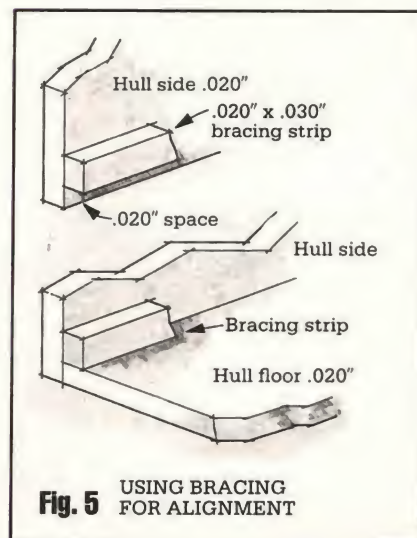


Fig. 5 USING BRACING FOR ALIGNMENT

the turret roof, part (13) just below (9) to cover the upper gap of the gun mount, and part (12) immediately below (13).

The trickiest part of building the turret is attaching the last four turret walls (14, 15, 16, 17). You may find that the shapes provided on the templates will not fit your model exactly because of slight variations in cutting or assembling the earlier parts. If your pre-cut parts don't fit properly, mark them up to show where revision is required and cut new pieces. If you're tempted to use the poorly fitting parts and try to fill in the gaps with putty or shims later, don't. To achieve tight, good-looking joints it's always best to cut new parts that will fit properly.

When adding the turret walls you will have to bevel both the side and top edges to ensure the best possible fit with the existing structure. Once the walls are in place, add part (11) across the gap between the lower portions of parts (14 and 15).

This completes the basic turret assembly. To fill small gaps I use liquid cement with plastic scraps dissolved in it. This mixture is tougher than putty

and also clings better. If you choose to try this homemade filler experiment with it on some scrap plastic before using it on the turret; if there is too much liquid cement in the mixture it can make a mess of weak joints.

Now assemble the gun mantlet (18, five parts). I left the two side parts slightly recessed as on the actual tank. To attach the turret to the hull, I cut a turret "ring" (36, actually a disc) from .040" plastic. This is the same diameter as the circular hole in the hull roof (26) and allows me to rotate the turret for photos. Alternate mounting methods include a simple peg-and-hole arrangement, or simply gluing the turret directly to the hull.

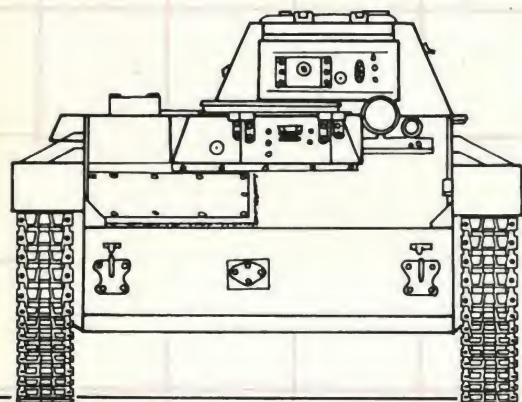
Building the hull. The T-60 hull is quite simple as tank hulls go. The only tricky part is the open grille over the engine radiator on the rear deck. On my model I added a fully detailed grille assembly as shown in the photos, but frankly, after covering the opening with screening, you can't see any of it. I would recommend cutting the rear plate (25) to fit all the way across the hull (the full size, including the dotted lines),

and painting the area below the screening with flat black paint. As well as being simpler, this method results in a stronger hull assembly.

To start the hull, cut out the parts (19 through 24). Do not cut out the

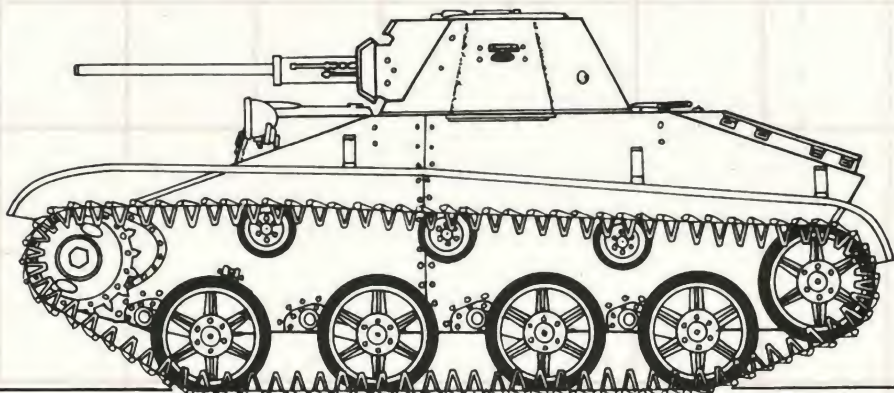
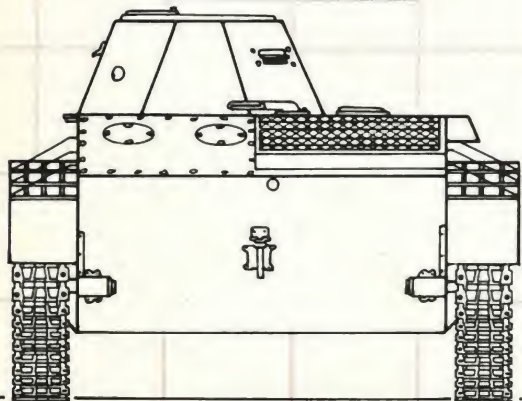
SOVIET T-60 MODEL 1941 TANK

Length:	14'-1"
Width:	8'-1"
Height:	6'-2"
Weight:	5.8 tons
Crew:	2
Engine:	GAZ-202, six-cylinder, water-cooled gasoline engine, 70 hp at 3,400 rpm
Armament:	One 20 mm TNSL cannon One 7.62 mm DT machine gun
Armor thickness:	7-20 mm
Road speed:	28 mph
Operating range:	380 miles
Builders:	Zarod Nr. 1 Gorki Automobile Factory (GAZ); Zarod Nr. 38 Kolomenskiy Locomotive Works
Ground pressure:	6.55 lbs per square inch
Number produced:	6,022
Service dates:	1941-1943
Variants:	T-60 Model 1942 with solid road wheels, thicker armor, and improved GAZ-203 engine

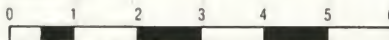


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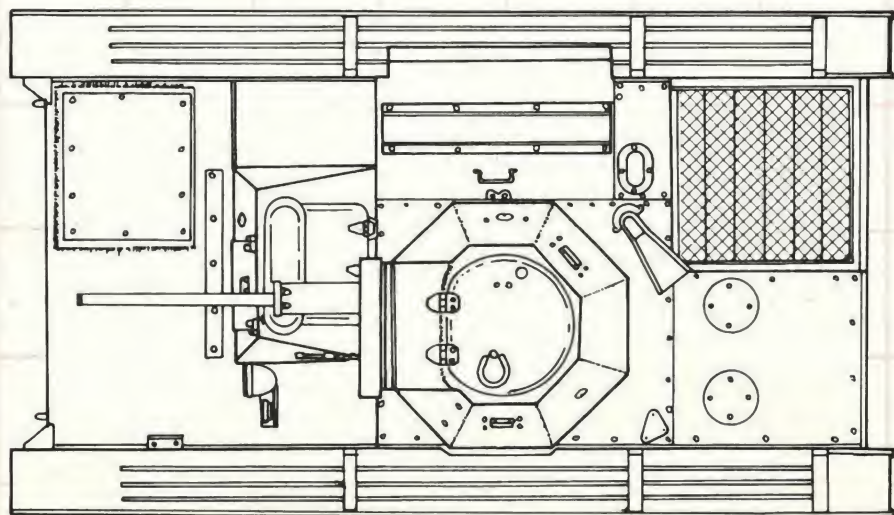
BY
Steve Zaloga



SCALE IN FEET



1/35 SCALE





Four photos. James Cochran

(Above and below) Four views of the T-60 at the Parola museum in Finland. This vehicle is from the later production batch with solid disc wheels. The headlight is missing, and the gun and mantlet on the tank are faked postwar additions.



Fig. 6. The basic hull assembly after adding the glasis, roof, rear panels, and grille (the black portion).

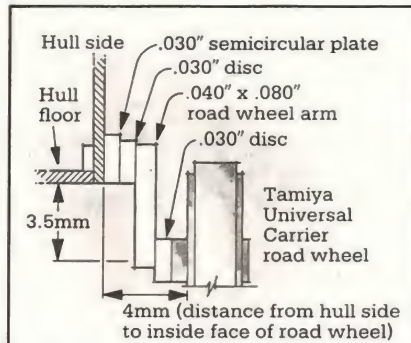


Fig. 7 SPACING THE SUSPENSION



small circles on the side panels (20, 21); these indicate positions where the torsion-bar road wheel arms and return rollers are to be attached. Cut out an extra part (24) to serve as an internal bulkhead to strengthen the assembly, Fig. 4.

Line the inside of the hull sides with .020" or .030" bracing strips located .020" from the edge of the parts, Fig. 5. These strips form ledges to which the other parts will be joined, strengthening the joints and helping to align the parts during assembly.

Starting with the floor (19), add the sides (21, 20), the bulkhead (24), rear plate (24), and bow and lower bow (23, 22). I cut out a rectangular opening on part (26) for the air intake to the right

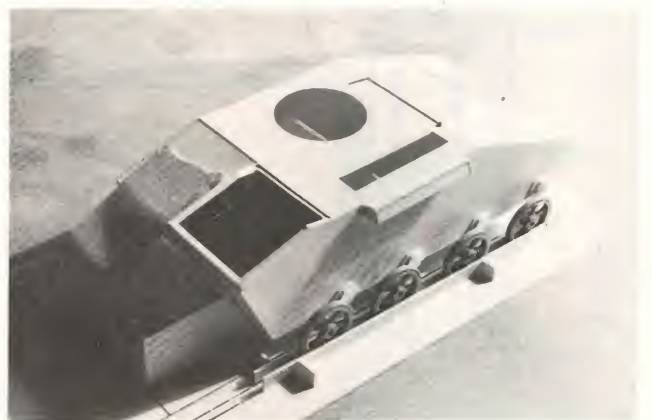
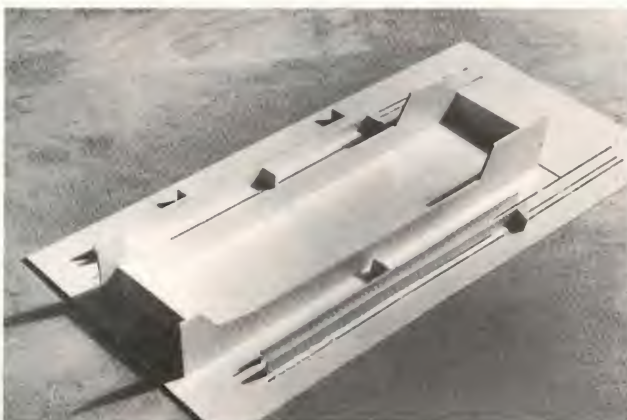
of the turret hole. This is not very noticeable on the finished model, so I have omitted it from the template.

Next add the roof (26), glasis plate (27), and engine deck (25, either long or short as discussed above), Fig. 6. When you attach the long, full-width version of (25) it should not mate with the right hull side (20) all the way at the top, but about 4 mm below the upper edge. The protruding portion of the hull side is the right side of the screened housing and should be the same size as part (28), the corresponding left side of the housing. You will have to bevel a few of the panels in this final assembly such as the joint between the glasis plate and the roof (27 and 26).

The last major assemblies are the



driver's position (31, 30, 32, 33) centered on (27), and the side panels for the engine air intake (29, three pieces) which attach to the side of (20) and the right edge of (26). These complete the basic hull assembly.



Figs. 8 and 9. The author constructed this simple crib-like holding fixture to aid in positioning the suspension parts on the hull.

It helps ensure that the finished model will sit level, and that the tracks will be the correct distance from the hull sides.

Attaching and spacing the suspension parts. One point that I cannot emphasize enough is that the road wheels and other suspension parts must be attached as strongly as possible to each other and to the tank hull. The track puts a lot of tension on these parts, and they will bend or break off unless they are firmly attached to the hull.

When attaching the road wheels to the hull side the critical measurement is the distance from the hull side to the center line of the track. (If you attach the wheels too close to the hull, when you go to add the tracks you are in for a nasty surprise!) The T-60 used torsion-bar suspension, meaning that the road wheels were mounted on trailing arms. Make these (you'll need eight) from

.040" plastic. Each arm is .080" wide by 10 mm long, and Evergreen Scale Models* sells .040" x .080" strip styrene (No. 144-B) which is ideal.

Instead of attaching the road wheel arm directly to the Tamiya Universal Carrier wheel, add a .030"-thick disc between the wheel and the arm as a spacer. A useful tool for making such discs is a leather punch. The punch, which can be found at larger hardware stores, resembles a set of shears but has a rotating, star-shaped head with punches of varying diameters. Discs made with a leather punch are not as

*Evergreen Scale Models, 2685 151st Place, Redmond, WA 98502.

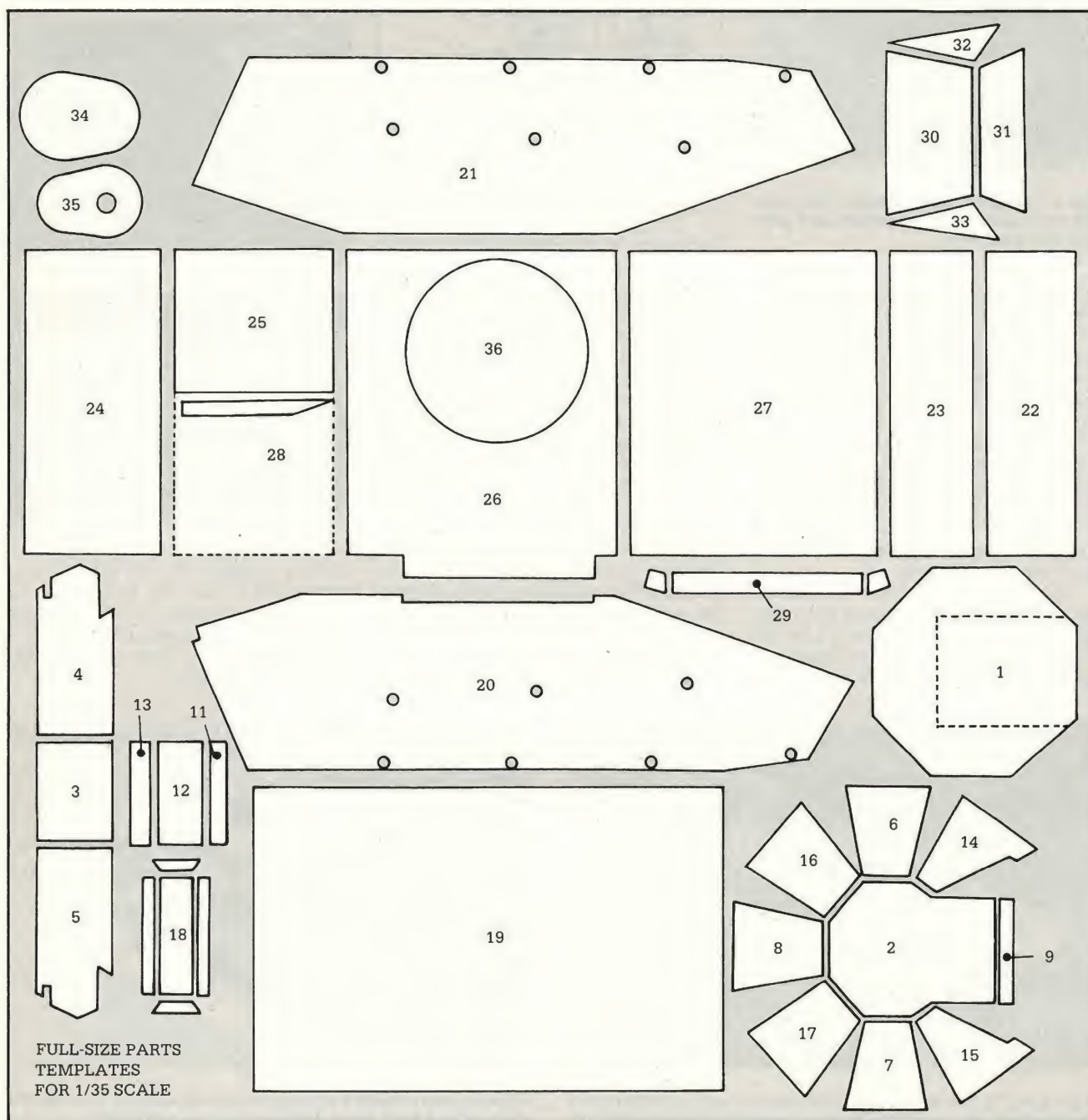
**Waldron Model Products, 1358 Stephen Way, San Jose, CA 95129.

cleanly cut as those made with a Waldron** punch set, but they are acceptable for items like this that will not be seen.

Add a .030"-thick semicircular mounting panel to the side of the hull for each road wheel arm, as well as another .030" disc spacer. All these layers, Fig. 7, should push the road wheels out far enough that the track will sit properly.

To attach the road wheels I construct a temporary "crib" under the model with a false floor on which the wheels rest, Fig. 8. This fixture holds the hull level and ensures that the wheels are aligned properly and remain vertical while being cemented to the hull, Fig. 9.

Make two each of parts (34, .010") and (35, .040"), which form the hous-



ings for the front drive sprockets. The circle on part (35) shows where the drive sprocket from the Tamiya Universal Carrier is to be attached. This assembly protrudes forward of the hull side, and its precise location is shown on the side view of the scale drawings. The rear idler wheels must be attached to heavy brackets mounted on the back of the hull. I made the brackets from the muffler of the Tamiya Universal Carrier kit, part B-19.

Heat-forming the fenders. The fenders on the T-60 are quite straightforward, and I made mine from styrene strips. The only tricky parts are the curved portions fore and aft. Although many modelers simply cold-bend the plastic and hope that the inner edges will hold the shape where they are cemented to the inner fender wall, I prefer to heat-form the fenders to ensure that they won't uncurl later, after the model is complete.

Start by cutting a 9 mm-wide strip of .040" styrene. Next, cold-bend the portions of the fender that will be curved to limber up the plastic and make it a bit more flexible. A good way to do this is to run the plastic over the edge of a wooden table a few times. Find a piece of metal tubing or other metal object which will give the fender the proper degree of curvature. I used a scrap of copper pipe, but a thick modeling knife handle would work, as would many other household items. Wrap the fender strip around the form and clamp it there, Fig. 10.

Now head for the kitchen and start some water boiling. Dunk the plastic, form, and clamp assembly into boiling water for five to ten seconds, then quickly remove it and drop it in a bowl of cold water. After it cools remove the clamp and form; the fender will hold the heat-formed curve permanently. The raised ribs on top of the fenders are .010" x .020" Evergreen styrene strips (No. 100-B).

Welds, rivets, and details. In common with many WWII Soviet tanks, the T-60 had a very crude finish on many parts. Particularly noticeable are the heavy weld beads around the driver's compartment and some of the turret joints. Simulate this by working a thin line of filler putty into the joint, then carefully trim and detail the weld with a hobby knife before the putty dries.

I made individual rivet heads from .040" plastic strip using a punch-and-die technique that I will explain in detail in a future issue of FSM. Rivet heads can also be made by slicing up a length of stretched sprue. I intentionally chose the T-60 over several similar vehicles because it does not require extensive rivet work. In fact, even in 1/35 scale it doesn't look all that bad without rivets.

Detailing the suspension was fairly straightforward. I used the Waldron punch set to make the many small discs needed for the torsion bar arms, wheel hubs, and other features. The track is from the Italeri PzKpfw IB, shortened by five shoes and tied together with nylon thread in three locations per track.

There isn't room here to explain all the sundry small detail bits and pieces on the T-60, but once you've gotten this far you can handle the detailing without problems. To make the screening on the rear deck, Fig. 11, I used some nylon drape material with the proper weave, but either the fine brass screen sold in model railroad shops or the very fine nylon screen used in silk screen printing (available at larger craft shops) would serve as well. The main gun, Fig. 12, is simply a length of 1/16" K&S aluminum tubing.

The paint scheme. Perhaps the most famous Soviet T-60 unit was the 61st Light Tank Brigade, which fought on the Volkhov Front (near Leningrad) in the winter of 1942-43. The 61st earned

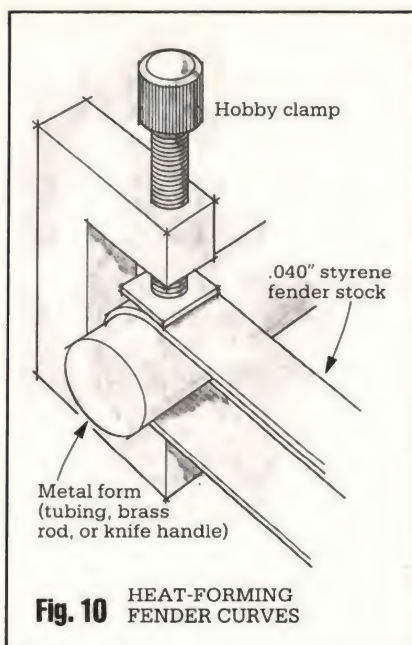


Fig. 10 HEAT-FORMING FENDER CURVES

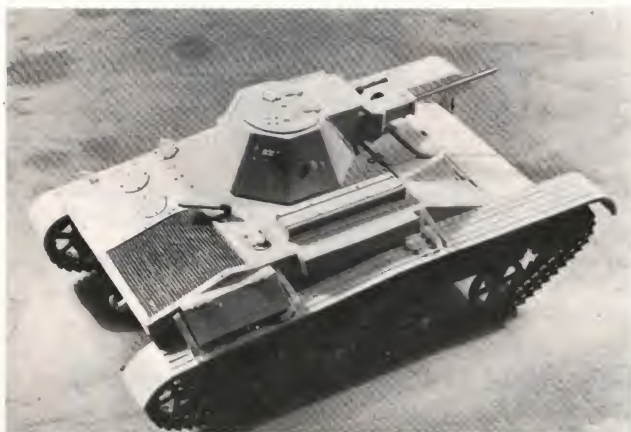
the grim distinction of being the first Soviet unit to face the new German Tiger I tanks, and was nearly wiped out in several very unequal encounters in the January 1943 counteroffensive in that region. The unit was later reformed on T-34 Model 43s and in 1944 became a Guards heavy tank unit with IS-2s. During the winter of 1942-43 the T-60s of the 61st were finished in the Type B scheme of whitewash over the base dark green, and I chose that color scheme for my model.

Good luck on your T-60!

FSM

REFERENCES

- Chamberlain, P., and Chris Ellis, *Soviet Combat Tanks 1939-45*, Almark, London, 1970.
- *Russian Panzers in Action*, Squadron/Signal Publications, Carrollton, Texas, 1972.



Figs. 11 and 12. (Left) Steve's article doesn't go into a lot of detail on how he made the details, but this view of the completed model before painting provides a good idea of what goes where. There isn't a great deal of detail anyway; the T-60 is a



rather plain vehicle, which is what makes it ideal for a first-time scratchbuilder. (Right) The T-60 after a base coat of dark green paint. The extreme lighting here shows off the excellent weld bead detail, which Steve models with hobby putty.

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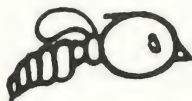
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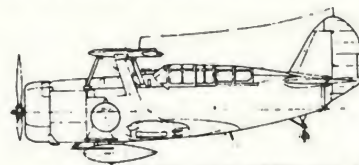
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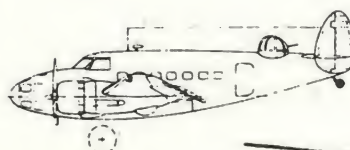


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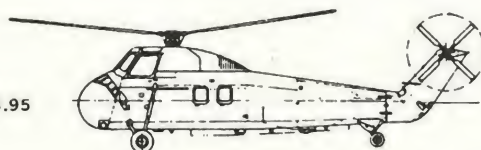
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Modeling a mountain man in the 20th century

Step-by-step techniques for painting and adding realistic buckskin texture to a 90 mm figure

BY BILL TILTON

ARTWORK BY THE AUTHOR

THE HISTORY behind the figures I model is a large part of the fascination of the hobby for me, and recently I became interested in the exploits of the mountain men. After extensive reading on the subject, my plan was either to scratchbuild a mountain man, perhaps Jedediah Smith or famed frontier opener Jim Bridger, or to convert one from Historex figure parts. But, as luck would have it, just as I prepared to work on my 54 mm figure, Series 77 Miniatures* released the first of their mountain men, figure A/16, "Jerry C. Crandall, Mountain Man of 1830."

When I opened the kit box, thoughts

of the 1836 rendezvous, the famous Green Mountain knives, and all the flavor of that lusty, rough-and-tumble time in frontier history came vividly to life for me. Pat Bird, the sculptor, did a marvelous job, and I took his excellence as a challenge: My goal in painting the figure was to make it come alive with colors and textures — from beads, to buckskins, to flesh tanned by wind and sun. Here's how.

Assembling the figure. As with any kind of kit, start by examining each of the 16 parts. Check that nothing is missing, and set aside small parts such as the powder horn and pouch ties so they won't be lost. Dry-fit the parts, and if necessary remove flash and mold lines. A small set of tool and die maker's rifflers** is ideal for this cleanup work. Rifflers aren't cheap — the 6" ones

I use cost about \$60.00 for a set of 12 — but they are the kind of professional tool that makes a hobby vastly more enjoyable.

Different modelers always have different opinions on whether figure parts should be painted separately and then assembled, or the whole figure assembled first, then painted. On the mountain man, contrary to the instructions, I glued all the large parts except the head together first, holding aside small items such as the powder horn, separate powder measure, retaining strap, pouch ties, and knife scabbard. I painted the head separately and added it to the figure quite late in the project. I also added a few last paint touches to the rifle after gluing it to the figure.

After filing down the mating surfaces of the parts, I used Hot Stuff II to make temporary joints so I could file down the areas where parts meet. For joining small parts, Hot Stuff or similar "super glue" is excellent, but for arm-size parts or larger I prefer 5-minute epoxy, such as Weldwood. I mix the epoxy on a plastic coffee-can lid according to its directions, then align and hold

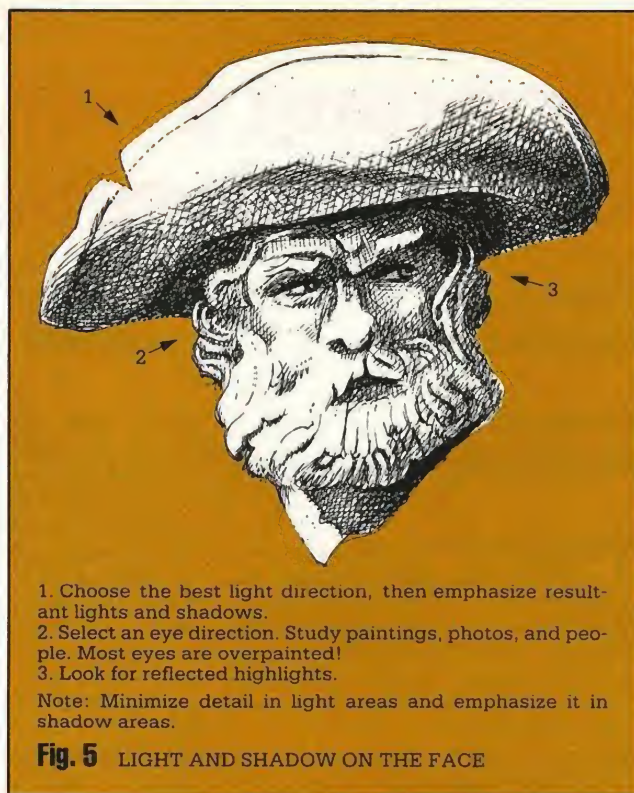
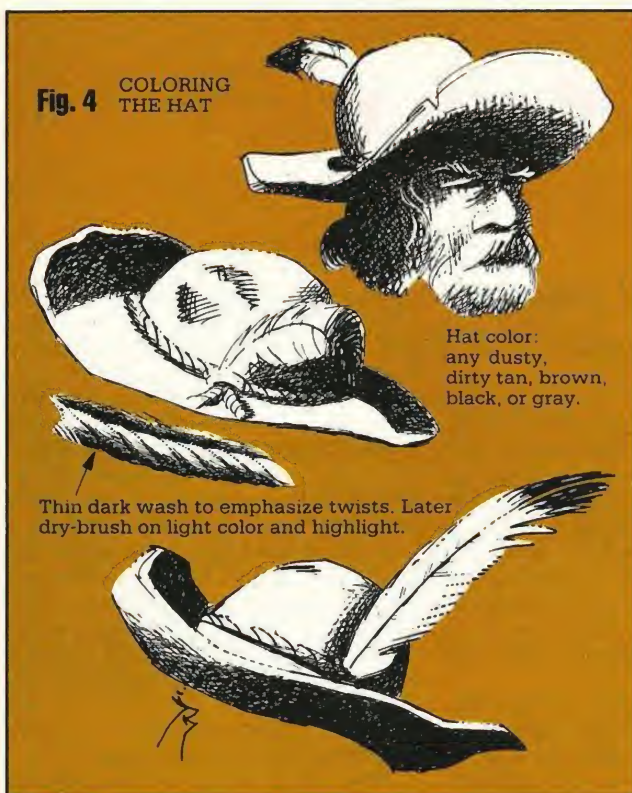
*Series 77 Miniatures, 7861 Alabama Ave. No. 14, Canoga Park, CA 91304.

**One source is the Brookstone Company, 127 Vose Farm Rd., Peterborough, NH 03458.



Figs. 1 and 2. Author Tilton used the Series 77 Mountain Man figure virtually unchanged. (Top) He simulated the shaggy texture on the mountain man's buckskins with thick casein paint, using a poke-and-pull technique. On the base (above), he covered the cast-in detail with realistic texture made from wood shavings, natural materials, and static grass.





the figure parts together using a "third hand" soldering fixture.

When the parts to be joined are heavy, the joint should be reinforced. One way is to drill matching holes in both parts so a short wire peg can be inserted. Another method, the one I chose to reinforce the arm holding the rifle, is to drill a series of random holes in each piece so epoxy can flow into them, creating small grippers or claws when dry.

To make it easier to handle, I also epoxied the figure to its cast base. My plan called for an additional two-part wooden base, so I drilled several holes into the upper wooden portion and into the metal base to give the epoxy a better grip. Then I drilled another peg

hole in the center of the upper wood base to secure it, in turn, to the 4" x 4" lower base.

With the figure essentially assembled, I carefully inspected the glued joints. One filler you may not have tried is Hot Stuff. Using the flat end of a toothpick, "shovel" plain baking soda into a gap, then apply Hot Stuff over it. The cyanoacrylate hardens instantly and the joint can then be filed, sanded, and finished.

To finish the joints before priming I

used a flexible-shaft hand grinder, my riffers, and several 1/8"-wide, carbide-grit Mylar strips*. You may be able to talk your dentist out of a few of these strips — their greatest advantage over other abrasives is that they can get into hard-to-reach places.

Priming metal figures seals them and inhibits surface oxidation, and more

*Cuttlefish Polishing Strips and Flint Abrasive Dental Strips are available from the J. Bird Moyer Co., Inc., Dental Manufacturers, 117-121 N. 5th St., Philadelphia, PA 19106.



Fig. 6. The head of the figure was painted separately. This extreme close-up is not particularly complimentary, but it shows some of the subtle shading and blending that the author achieves with relatively fast-drying alkyd colors.

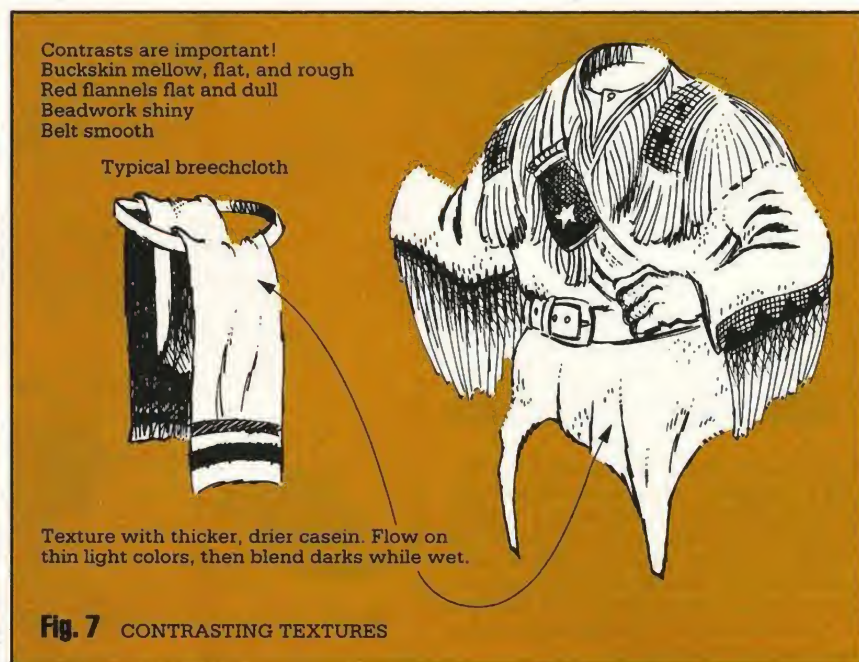




Fig. 8. The subtle shading on the finished figure makes it hard to see, but one important aspect of Bill's technique is pre-shading areas where differing materials meet, as here on the back where the buckskin, beaded border, and fringe textures touch one another.



Fig. 9. This closeup photo shows off the colorful and intricate beadwork and highly effective buckskin texture on this 90 mm mountain man. Note the darker shade of tan used on the breechcloth.



(Top and above) These photos of the completed figure are close to actual size. Note the variety of colors and textures the author has managed to incorporate into what some modelers might see as a drab, almost monotone subject.

important, a coat of primer reveals flaws such as missed mold lines, flash, and insufficient work on joints. My favorite primer is Floquil's MA9 Figure Primer, which dries rapidly, is exceptionally thin, and shrinks evenly around detail. After priming, once again examine the figure carefully, filing or filling deficiencies. Then, lightly reprime, continuing the inspection routine until you are satisfied.

Texturing the base. I wanted the figure base to contribute to the overall effect of the figure, so I decided to cover the cast-in detail with more lifelike texture. I started by filling in the figure title and date with epoxy, and when that had dried I applied a thin coat of acrylic gesso, manipulating it with a brush and sponge to add relief.

Next, I dug out my collection of lichen, twigs, pebbles, seeds, thorns, bits of cork, and sawdust to add weedlike texture to the base. One texture material I learned about long ago is wood dowels run through a pencil sharpener; used singly or in clusters, the shavings look just like plant leaves.

Something I hadn't tried before, but wanted to, was the static grass mentioned by Shep Paine in his book, *HOW TO BUILD DIORAMAS*. I liked the olive shade that Shep used, but the only colors in stock at my hobby shop were a harsh dark green and an unrealistic reddish brown. However, at the shop I noted some strange faded spots on the packages that the store owner couldn't explain. Having an idea of what had caused the spots, I bought a sack of each color. At home I spread the contents of both sacks on a large, white enamel paint tray and misted the material with straight Clorox bleach. Several hours later the "grass" was bleached white, and I transferred it to a jar and covered the top with perforated plastic

wrap to let the bleach evaporate in the sun.

With all the base materials at hand, I painted a coat of full-strength acrylic matte medium (white glue will do as well) over the base, flowing it up to, but not onto, the moccasins. Using tweezers, I added each bit of large growth blade by blade, followed by pebbles, seeds, and bits of cork. I sprinkled sawdust on a few areas for textural variety and applied static grass to the rest, rolling it off my fingers as one would salt. Then, as recommended in Shep's book, I blew gently against the grass and almost magically the blades stood upright.

With a small hair dryer, I applied heat and the base was soon ready for more treatment. This time I thinned the medium slightly, and then dabbed it on using a large watercolor brush. Finally, I applied more static grass onto the wet medium and blew it, too, into an upright position, then set the base aside to dry naturally, Fig. 1. Painting it would come later, after preliminary work on the figure.

Achieving the buckskin texture. Developing a technique to simulate buckskin texture was an experiment — one that worked! The material I chose was one of my favorite painting mediums, casein, and the brand I used was Shiva, available at most art supply stores. Using an oil painting brush, a bristle flat, I dabbed a brushful of white casein against a paint cloth until most of the paint was removed. Then, as evenly as possible, I stippled the almost-dry paint

onto the buckskin areas of the figure.

Don't stroke the paint, but instead jab or pounce it against the figure. The idea is to create a three-dimensional texture consisting of little peaks and wisps of paint, Fig. 2, and the trick is to have the paint as dry as possible while



Figs. 10 and 11. The bearskin and calfskin pouches (left) and the metallic parts on the rifle (right) were among the final items to

be painted. The cast-metal feather was painted separately and added after all other work was complete.

still workable. After texturing the entire figure, I used damp cotton swabs and wet toothpicks to clean the casein from surfaces such as the beadwork and the face of the hatchet, then allowed the texturing to dry overnight.

Underpainting the figure. After giving the buckskin texture a full day to dry, I began painting. I always underpaint first, either with casein or acrylic, usually acrylic, because the pigment seems to be ground more finely. For years I have used Grumbacher's Hyplar for underpainting, but I've never liked acrylic performance on 54 mm or smaller figures. Recently, though, I completed extensive testing of Polly S, and am convinced it will do first-rate figures. I used it to underpaint the mountain man.

Acrylics are forgiving — if you err, denatured alcohol removes the paint, or you can simply paint over the error. If you choose Polly S, disregard the advice about letting it dry for hours between coats and arm yourself with a good hair dryer.

Perhaps the greatest advantage of acrylics is that they dry fast, allowing you to rapidly establish your desired color scheme, then simply keep right on painting until you have a finished figure. I had planned to limit my use of acrylics on the mountain man to undercoats that would emphasize shadows and highlights, but the Polly S was so effective I almost stopped after applying it. I used a diluted mix of raw and burnt umber over the gray primer and the effect was startling: The thinned paint sought out the hollows and grooves and settled around raised features and the base of the beads, creating a delightful and dramatic chiaroscuro (light-and-shade) appearance. Try it!

Next, like the old masters, I painted all the flesh areas with a cool undercoat of pale blue-green. After that dried, I began lightly scrubbing on the old mas-

ters' skin formula (consisting of burnt umber, ultramarine blue, yellow ochre, light red, and white mixed in proportions to produce the desired skin color) and presto, as usual, a lively and convincing real-flesh look appeared. I set the figure aside for the Polly S undercoats to dry thoroughly, although I was sorely tempted to stop right there and pronounce the figure complete.

Using alkyds. When the undercoated areas had dried it was time to get out the alkyds. I've worked with alkyds since they came on the market a few years ago, but rarely on figures. I know of only two brands: Winsor & Newton Inc. of England, and P. D. Q. Artist Oil Paints.** Both brands dilute perfectly with mineral spirits (which I recommend in place of turpentine), and either can be used with Winsor & Newton's Liquin, a quick-drying medium, or P. D. Q.'s Lolar Glaze Medium, but both tend to make the paint glossy.

On a disposable palette, I squeezed small, pea-sized blobs of raw umber, burnt umber, ultramarine blue, cerulean blue, Naples yellow, yellow ochre, sap, green earth, light red, and titanium white. I blended raw umber and yellow ochre, diluted them quite thin with mineral spirits, then flowed this wet mixture over all the texture material on the base. Then I diluted a darker mixture of burnt umber and ultramarine blue and, with the tip of a loaded brush, touched the bases of plants and rocks, flowing the color into the recesses and creating basic shadows.

Next I added various blends of greens and light red, flowing the greens down the sides of the taller grasses and touching the red lightly against some of the rocks. As these colors are setting up

(alkyds dry rapidly, far faster than oils), provide some interesting light values by dry-brushing the upper surfaces of vegetation with touches of white tinted with yellow ochre, Naples yellow, or the umbers. This enhances the depth of the groundwork. Now, flow darker colors, such as greens mixed with umbers, on root areas and around the bases of rocks to create shadows. You'll find this method of flowing the color into the base yields natural color transitions.

More skin tones. Next I mixed the old masters' skin formula once again, this time in alkyds, and lightly rubbed on some color in the flesh areas. Incidentally, the brushes that work best for me for this sort of blending are short flat sables, either almond-shaped or contour rounds. I highlighted several areas with rubbed-on white and darkened others with a mix of burnt umber and blue. This mix yields better, more lively shadows than black.

While the main figure was drying I started on the knife and sheath, Fig. 3. Step one was to flow on the burnt umber and blue dark mix, with more blue added before thinning, and allow it to settle in all the recesses, emphasizing every bead. Flow the same color into the shadow areas all over the figure — behind the pack and under its flap, behind the belt buckle, on the moccasins, and so on. Work delicately, avoiding sharp contrasts. The idea is to define the beadwork, fringes, and boundaries such as where the hat joins the hair.

After flowing the dark mix into the grooves and detail of the beard, hair, and moustache and allowing it to dry, I added light red and white to the dark paint and lightly scrubbed over those areas with it, then highlighted the hair further with a cotton swab dipped in mineral spirits. As a final touch, I gently dry-brushed a still-lighter tint of the same color on the uppermost edges of the hair masses.

*Winsor & Newton Inc., 555 Winsor Dr., Secaucus, NJ 17094.

**P. D. Q. Artist Oil Paints, 6059 Larchmont Ct., San Jose, CA 95123.

I painted the hat, Fig. 4, dark gray using a mix of ivory black, yellow ochre, and a touch of white. Use a dark blend of burnt umber and ultramarine blue under the brim to define the hatband, and for creases and dimples in the hat. With most of the paint wiped from the brush, rub and scrub Naples yellow on the upper parts of the hat to develop highlights. Although rubbing and scrubbing are hard on brushes, you'll appreciate the controlled blending they make possible. This is a good use for worn brushes.

Add more skin color with a small stub of an old watercolor brush. Sparingly apply thinned light red to the cheeks, lips, sides, and tip of the nose. Using a No. 1 red sable, a great brush because it holds little paint, apply burnt umber to define shadow details on the face, Fig. 5.

Highlighting the face. Highlight the upper and outer planes of the nose and nostrils, define with a darker color, then blend. Draw a burnt umber line between the lips, then soften it in the middle. Add more light red to the lips, and blend burnt umber into it on the upper lip to help it recede properly. Lastly, blend a touch of white along the top side of the lower lip, emphasizing its proper plane and avoiding a lipstick look. Paint the whites of the eyes with a mix of raw umber, Naples yellow, and white. Around the eyes, rub a little violet in the socket area for natural color and depth, Fig. 6.

While I could offer stroke-by-stroke face painting methods, let me suggest something better. The greatest artists who ever lived have, at one time or an-

other, copied the works of artists they admire. By doing this, you are forced to not only learn the techniques, but to analyze how the artist achieved his effect. Obtain some good reproductions of portraits by artists whose works you like, Rembrandt for example, and try to duplicate a face, with all its colorations, on your figure. I bet you'll be amazed — and pleasantly surprised — at the results. The same holds true for hands, boots, and uniforms. You'll find that great artists use some surprising colors in highlights and shadows.

Coloring the buckskin and beads.

Dilute a mix of raw sienna and raw umber with mineral spirits and use a No. 6 red sable brush to wash the color over the casein-textured shirt, trousers, and breechcloth. While these areas are still wet, gently stroke a less-diluted darker mix of the same colors around the shadow areas, Fig. 7. For me, this step was just about like painting a blotter. I brushed my darkest mixture into the deepest parts of shadows and used it to define shapes and details like those outlining the beadwork, and then flowed diluted umber over the fringes where they joined the sleeves, Fig. 8. The paint settled naturally in the recesses, and I then worked it out over the belt and straps, and finally over the breechcloth, which I wanted darker than the rest of the buckskin.

I arbitrarily decided to paint the moccasins with authentic red quillwork. I found no magic, easy formula for painting the beads; I simply painted each bead and quill individually with the thickest paint that I could manipulate. Later, to complete the work, I decorated the sides and black uppers with white bars and evenly spaced green triangles outlined in yellow. (My reference for this was color photos from a museum.) I also added black triangles over the yellow bead trimming on the sleeves and legs.

I painted the shoulder straps and the tobacco pouch star turquoise blue, and carefully added red, white, and black beads, Fig. 9. The knife was painted separately, first with red and, after that was dry, the other colors, again, bead by bead. I colored the handle using raw umber and white so it has an ivory, elkhorn look. For the powder horn I chose an amber color to represent a cow's horn with a blackened tip.

Finishing up the details. My mountain man's long flannel underwear is faded red, as is his tomahawk handle. I painted the small fur pouch to look like bearskin and the hip pouch to look like soiled, worn calfskin, Fig. 10. Rawhide seemed a logical choice for the braided hatband, so I highlighted its upper surfaces with a dry-brushed mix of yellow ochre and white (earlier I had flowed dark umber over it to settle in the twists). I added a brass keeper simply because the bit of color looked good.

I used light grays and some black at the tip to make the hat feather convincing, but not overly bright. Remember, these lads often had dirty paws, and just about everything they touched had a stained, earthy look. I refined the lights and darks of the hat with paint but I could have used pastels to create a dusty look.

I touched up the hatchet head, rifle barrel, and lock with a cold blue-gray and detailed with blue and umber in varying proportions. Earlier, I had carefully painted dark umber around the base of each brass nail on the stock, so now I accented the brass itself using the following method: Dip a toothpick deep into *unstirred* brass paint and put a small blob of it on the palette. Using the tip end of another toothpick, place a dot of the brass pigment on each of the nail heads, Fig. 11. This is far easier than trying to paint those minute circles by hand.

When I was sure the steel parts of the rifle were dry, I rubbed a soft graphite pencil over them and followed it with a soft rubbing with a cotton swab. The resulting metallic effect is quite realistic!

From this point, completing the figure is a matter of careful study and patient final detailing, highlighting, and darkening. This is the right time to set the figure aside for a spell, critically looking at it in different lights and from various positions. When I was reasonably satisfied, I covered a 4" wood cube with real buckskin, adhering it with 3M spray adhesive. I then carefully glued on three rows of authentic Indian beads, added brass nails, and used a Hot Tool* to brand "1830" on the leather.

After I misplaced the pouch ties supplied with the kit, I made replacements from thin sheet lead. This is a handy modeling material, and a good source for it is the lead foil seals that come wrapped around the necks of wine bottles. I place the seals in a jar, add lacquer thinner, and after a brief soaking, scrub the paint off the seals with a toothbrush. That done, I burnish the lead smooth by placing it on top of an old phone book and rubbing it in a circular motion with a spoon. The result is a slick, shiny piece of very useful thin lead.

The final step in modeling the mountain man was attaching the feather with Hot Stuff. Deciding if a figure is finished is always hard for me, so my wife and other friends decided this one was now complete!

FSM

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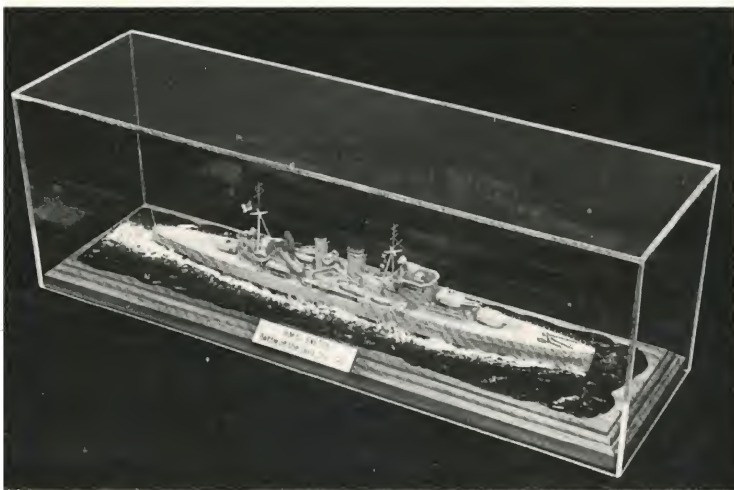
*Available from Santos Miniatures, P. O. Box 4062, Harrisburg, PA 17111.

Meet Bill Tilton

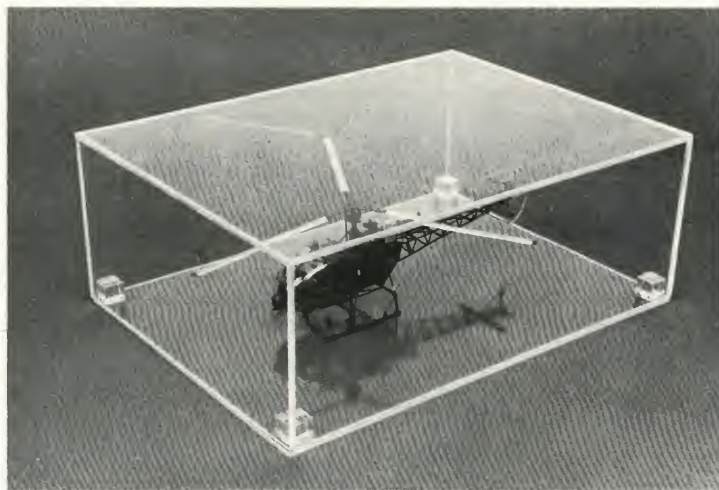
A modeler for over 40 years, Bill Tilton retired from the Regular Army as a colonel after 31 years of service. During World War Two he served as an army engineer in the Pacific theater, and his subsequent tours of duty included Korea, Canada, Africa, and Germany. He writes that he "built aircraft almost exclusively until during my final Army assignment in Germany I got myself hooked on miniatures."

Now a full-time professional artist with his paintings in over 400 private, corporate, and government collections, Bill holds a Master of Fine Arts degree from the University of Denver. He has been an illustrator, art director, and artist for various companies, including Walt Disney's studios.

Bill recently completed a historical novel about buffalo soldiers that he hopes to eventually produce for television or as a motion picture. Today he and his wife Alice live in Alexandria, Virginia, where Bill maintains his studio and workshop.



Each display case should be in harmony with the model. The proportions should be pleasing and the model should not seem



Both photos, FINESCALE MODELER: A. L. Schmidt

crowded into or lost in the case. These photos deliberately accentuate the cases; in reality the plastic is nearly invisible.

How to make clear acrylic display cases

Protecting and preserving your models with plexiglass

BY DENNIS MOORE

DUST IS the worst enemy of any fine model. Try as we may to keep an uncovered model presentable, any model left out in the open inevitably becomes coated with dust and grime. The only solution is to store the model in a case or windowed cabinet.

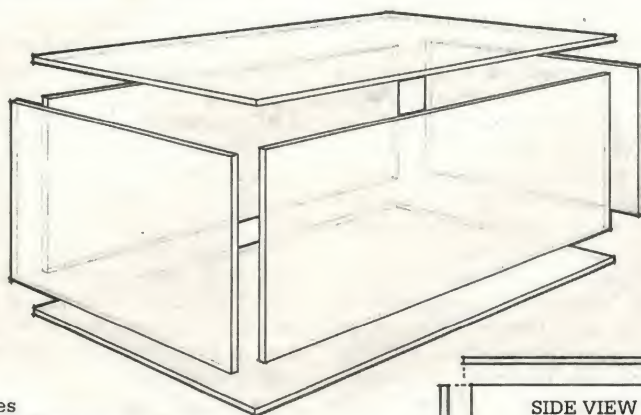
After I'd won a few IPMS trophies, I was determined not to let my winners be ravaged by dust, so I began looking around for a plastic case that would protect them. I discovered that commercial cases were either designed for 1/72 scale aircraft, and small ones at that, or were long and narrow and better suited for autos, small ships, and armor models than for the helicopters and

large ship models that I wanted to display. Having rummaged through a pile of old modeling magazines vainly looking for something more suitable, I decided to let my fingers do the walking through the Yellow Pages. I drew a blank at the display and showcase firms I called until, finally, one of them told me that I could probably make what I was looking for myself and suggested that I call a local plastics dealer.

Buying the plexiglass. The plastics dealer told me I needed 1/8" sheet plexiglass and that he'd cut pieces to whatever sizes I required. The first model I wanted to protect was a 1/50 scale Indian HAL SA 315B Cheetah, a license-built version of the French Aérospatiale Lama helicopter. I thought the model would look best if the case were slightly longer, wider, and higher than the chopper so that it would not look lost in a case that was too large or cramped in one that was too small.

After determining the dimensions, I ordered six pieces of 1/8" plexiglass cut to size. I wanted a case 10" wide, 15" long, and 8" high and I wanted the top to rest on the side and end pieces, so I ordered two pieces 10" x 15" (the top and bottom), two pieces 7 3/4" x 14 3/4" (the sides), and two pieces 7 3/4" x 10" (the ends), Fig. 1. I also bought four 1/4" clear drawer-pull cubes that I planned to cement to the corners of the bottom sheet: These would index the upper portion of the case to its bottom piece, thereby preventing the upper portion from slipping on the bottom piece and possibly damaging a model.

By the way, it doesn't matter which brand of plexiglass you order: The most common brands in the U. S. are Du Pont's Lucite, Rohm and Haas' Plexiglas, and American Cyanamid's Acrylite. In Britain, ICI's Perspex is most common. All are similar acrylic plastics (methyl methacrylate resins if you want to be technical) and all are suitable.



Six pieces of 1/8" plexiglass are required for a case 10" wide, 15" long, and 8" high:

- 2 pieces 10" x 15"
- 2 pieces 7 3/4" x 14 3/4"
- 2 pieces 7 3/4" x 10"



FIG. 1 BASIC CASE ASSEMBLY



FIG. 3 SMOOTHING ROUGH EDGES

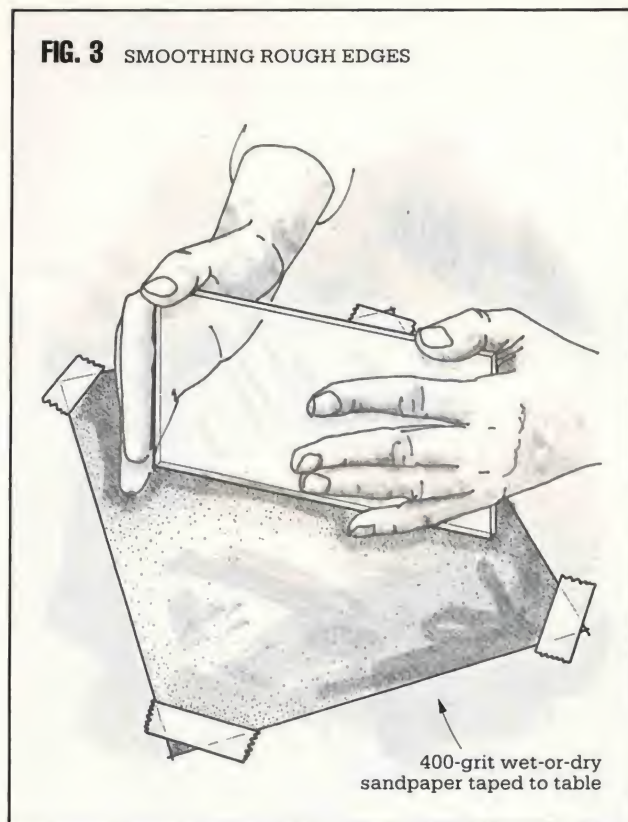


Fig. 2. Sheet plexiglass is always protected on both sides from scratches by adhesive-coated paper during shipping and machining. Remove the paper before assembling your case.

Also, if there's no plastics dealer in your area, most hardware stores will order any quantity of plexiglass you require.

When you pick up the plexiglass, also buy a bottle of plexiglass cement and a tube of Blue Magic metal polish cream or some other cream or liquid polish for plexiglass. You'll use the polish to rub out any scratches in the plastic (I prefer the liquid because it leaves less residue). If you already have a supply of IPS Weld-On #3 cement, it'll work fine. Plexiglass cements are similar to the liquid plastic cements we use on kits in that they melt a small quantity of the surfaces being joined, causing them to fuse together when the cement evaporates and the plastic rehardens. (However, most liquid plastic cements won't work on plexiglass.)

Removing scratches. Sheet plexiglass is always protected on both sides by an adhesive-coated paper, Fig. 2. Peel off this paper before assembling the case. If, in spite of the paper, the plastic has been scratched, simply rub out the scratches with plastic polish. If some of the adhesive from the paper sticks to the plastic, remove it with a soft cloth dampened with naphtha, cigarette lighter fluid (also naphtha), or mineral spirits. Don't use stronger solvents such as acetone or lacquer thinner because these will etch plexiglass.

After you've removed the paper and

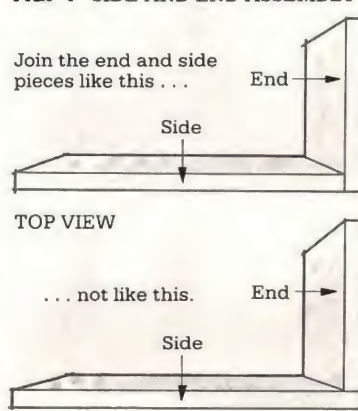
any scratches, check the edges of the sheets for saw marks. This has never been a problem for me, but a friend says he's had pieces that came with rough edges. If it happens to you, tape a full sheet of No. 400 grit wet-or-dry sandpaper to a flat, waterproof surface, Fig. 3. Moisten the sandpaper with water and rub the rough edges on the sandpaper until they are smooth. Be sure to hold the plastic at a right angle to the sandpaper to preserve the square edges.

Assembling the sides and ends. Begin assembly by cementing one of the side pieces to an end piece. If, as I do, you want the end piece to extend the full width of the case, be sure to butt the end piece against the side piece as shown in Fig. 4. I apply IPS Weld-On #3 with a draftsman's ruling pen, touching the point gently against the seam; capillary action draws the cement into the seam, Fig. 5. Needlepoint applicators sold in plastics stores, Fig. 6, and even fine-tipped brushes also make good applicators. Hold the pieces for about a minute to give the cement time to weld the seam. Then check to see that at least half of the seam is filled with the cement. If it isn't, apply more cement. Work in a well-ventilated area because the fumes from plexiglass cement are toxic.

Once that first "L" shaped section is done, it's simply a matter of repeating

the same steps for the remaining side and end pieces. You can eyeball the right angles — because the pieces were all cut on the square, it's hard to go wrong. If you don't trust your eyeballs, place a sheet of graph paper or some other paper with a grid pattern on your workbench and use it to ensure squareness, or use a T-square or combination gauge. After the last joint has dried for several minutes, very carefully turn the topless and bottomless box over and run some more cement into the joints that were on the bottom during the first

FIG. 4 SIDE AND END ASSEMBLY





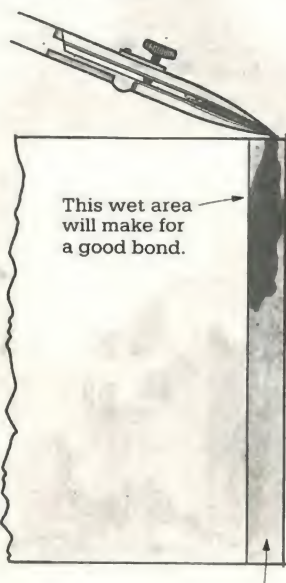
FINESCALE MODELER: A. L. Schmidt

Fig. 6. You may want to apply plexiglass cement with a needlepoint applicator. Return the cement to its glass bottle after each working session or it will evaporate through the plastic container.

Fig. 5. Capillary action draws the plexiglass cement into seams where it dissolves a small quantity of the plastic, causing the mating surfaces to fuse together.

FIG. 7 FILL ALL SEAMS WITH CEMENT

After you've joined all of the end and side pieces, turn the case over, and apply cement to all seams that were not completely filled during initial assembly.



Cement this area when the case is turned over.

application, Fig. 7. Often these will not have received enough cement the first time around.

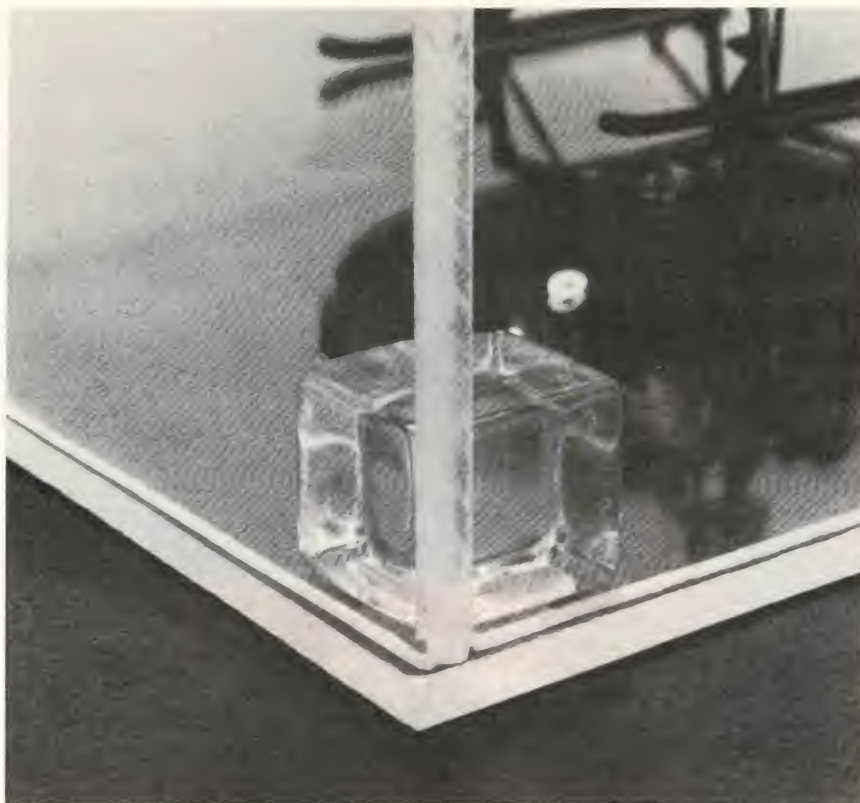
During all of these applications be careful that you don't overload the ruling pen with cement. The paper that protected the plexiglass sets up a strong charge of static electricity when it's removed. This static charge has occasionally pulled a large drop of cement right off the pen I was holding onto the plastic. If this happens to you, don't have a heart attack; simply blow on the cement until it evaporates, or blot it gently with a tissue. Don't rub it or you'll mar the surface. If you dab up the cement or let it evaporate, the worst you should wind up with is a mark that looks like a water stain; this can be buffed out with plastic polish after you have completed the case.

The top. Turn the case on its side and begin to cement on the top using the same technique as previously. If the sides are especially long, support the side from inside the box with your hand so that it will not bow. The top and the side should be flush all along their length. Plexiglass is available in many thicknesses, so if you want a case to cover a large diorama, you might want to consider 1/4"-thick sheets because they would be less likely to warp or bow. Once everything has been fas-

tened together, check one last time that all seams are filled with cement. Then let the box sit for several days until all the seams have hardened.

The bottom piece. If you are building a case that is going to cover a model permanently attached to a base, such as my 1/400 scale Heller *Dunkerque* on the front cover, you don't need a bottom piece unless you plan to stack the cases. If the model has no base or you want to stack the cases, obtain the clear plexiglass drawer pulls I mentioned earlier and cement one to each corner of the bottom piece, Fig. 8. Place the cubes 1/8" in from each corner. You'll now be able to remove the case from its bottom at any time, and you'll be able to slide the case around without any danger of the case sliding into the model. One final option is to add rubber feet to the bottom, Fig 9; these make it easier to pick up the case, prevent the bottom from being scratched, and add a nice touch. Self-adhesive rubber feet are generally sold in electronics stores.

Cleaning the case. Remove any fingerprints that have accumulated during construction with Windex, any other household glass cleaner, or 70 percent isopropyl alcohol (rubbing alcohol). You may also wash the case periodically with dishwashing detergent and warm water; this will reduce any static elec-



FINESCALE MODELER: A. L. Schmidt

Fig. 8. Dennis cements clear acrylic drawer-pull cubes at each corner of the bottom piece. These index the bottom piece with the rest of the case, ensuring that the upper portion of the case can't slide against the model.

trical charges. To prevent scratches when drying the case, let it air dry or wipe it gently with a damp chamois or soft cloth. Believe me, it's a lot easier to wash a sturdy case than it is to clean a delicate model! If you desire an especially high gloss, you may apply a thin coat of any good wax such as Johnson's paste wax to the case. Lightly polish the wax with a piece of soft flannel.

Advanced projects. If you're used to working with styrene, you should have

no trouble learning how to saw, drill, bend, draw-form, and even vacuum-form plexiglass so that you can create display cases with shelves to hold several models or design cases to fit into a specific location. (I buy my plexiglass precut simply because I'd rather spend my leisure time building models, not because the material is difficult to work with.) As is styrene, plexiglass is a poor conductor of heat and melts at a relatively low temperature, so work slowly, lubricating tools frequently with water or a soluble cutting fluid. Should you want to join plexiglass to wood, metal, or some other material, use epoxy or one of the super glues. The two books listed below contain much information on working with sheet acrylics, and there are many others.

A case to protect an average 1/48 scale fighter should cost about \$5 and one to cover a large 1/400 ship about \$11. That's really not much when you consider the hours we spend to turn out the jewels in our collections, and how easily they can be destroyed by those nasties in the air. **FSM**

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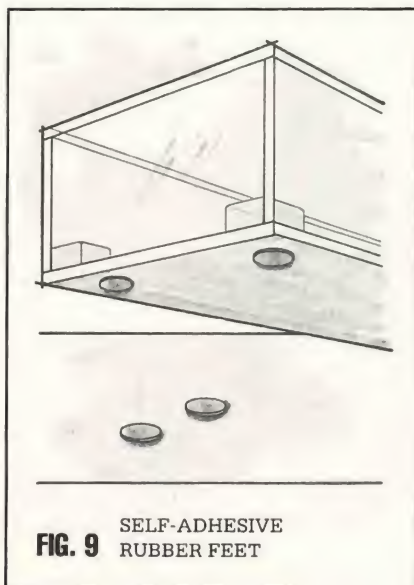


FIG. 9 SELF-ADHESIVE RUBBER FEET

VULTEE VANGUARD



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Matra

It's difficult to obtain close-up photos of Grand Prix race cars, so these shots should be a godsend to modelers. Paul took all of the photos at the Long Beach Grand Prix.

FORMULA 1

race car cockpit detailing



The techniques are every bit as applicable to aircraft

BY PAUL BUDZIK



(Above and top left) Scratchbuilt six-point harnesses add to the realism of the author's 1/12 scale models of Grand Prix race cars.

Tyrrell



Matra



Williams

IT'S TRUE that your model will first be judged on the quality of its assembly, finish, and markings. All the details in the world won't help if you have spoiled the overall effect with bad paint and decals. However, if you've reached the point where you can assemble and paint reasonably well, there's nothing more satisfying than scratchbuilding detail parts that will really dress up your model.

This is especially true for the cockpits of 1/12 scale race cars. For one, most of the kits now available are excellent, so you start with a good foundation. For another, the models are large enough that the details can be seen and appreciated. Third, I'm fascinated by a race car's cockpit because it is the driver's workplace; an accurately detailed model cockpit provides an observer

with a close-up view of a seldom-seen but often fantasized about area.

Research. Ideally, you should begin with close-up photos of the full-size car you're modeling. Unfortunately, as far as Formula 1 cars are concerned, this may be difficult because U. S. Grand Prix race organizers are not very sympathetic to the modeler. In the past, \$100 bought limited access to the pits at the Long Beach Grand Prix but even that option is no longer available. In many cases, therefore, you'll have to trust the accuracy of the kit manufacturer's research — I highly recommend Tamiya's 1/12 scale kits.

However, photos of instruments, seat



Fig. 1. The Willans six-point harness is a favorite with race car drivers. Similar harnesses are used in aerobatic aircraft.



Renault



Lotus

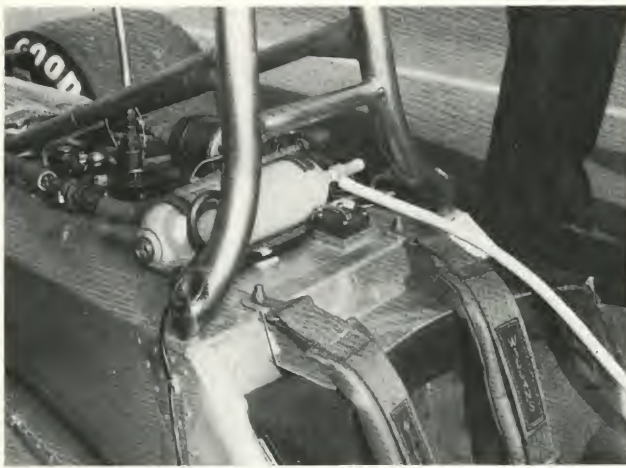
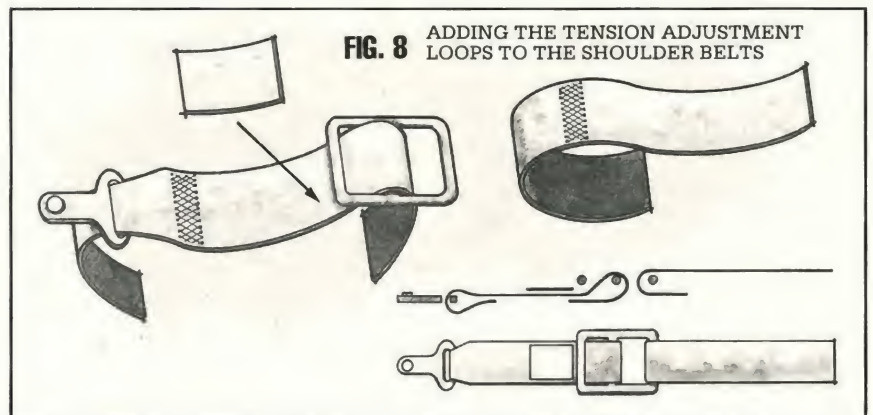
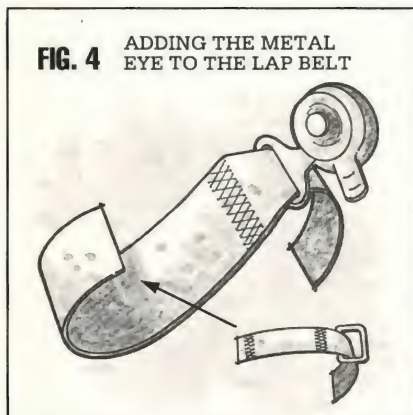


Fig. 2. These padded shoulder belts bolt to the chassis behind the cockpit just forward of the oxygen bottle.



Fig. 3. On the Williams Ford the lap belts are anchored to the outer wall of the cockpit.



belt harnesses, and accessories are more readily available and I've listed several sources at the end of this article.

Fortunately, Can-Am, Trans-Am, GT, and drag racing fans usually have no trouble taking photos of full-size cars at local races — just remember to attend during practice and qualifying times when the crowds are smaller.

Building the harness. By way of background, the cockpit of a modern, single-seat race car is an extremely confining space. Drivers are, as a rule, not large and the cars are frequently

built around a specific driver, which is one reason why no two chassis are exactly the same. The driver must be fastened into the car in such a way that he has an instant feel for what the car is doing: A six-point harness provides the necessary restraint. The harness consists of a lap belt, two shoulder belts, two crotch belts, a tension adjuster for each shoulder belt, and a master buckle called a quick-release, Fig. 1. The two halves of the lap belt buckle directly into the quick-release. The crotch straps pass through eyes sewn onto the lap

belt. The shoulder belts are then brought through loops and are buckled into the quick-release. Figure 2 shows that the shoulder belts are often fastened to the chassis with metal loops and bolts; the lap belts are fastened to the outer sides of the cockpit walls, Fig. 3.

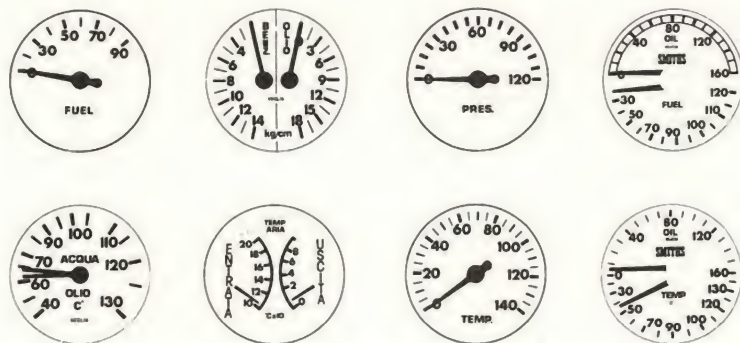
I start construction with the lap belts. I make these from cloth tape of an appropriate color and cut the tape so that it is 3/4 scale inches wide. About midway between the edge of the seat and the buckle I install an oval eye made from .018" stainless steel wire. I fasten



Figs. 5 and 6. Paul makes the tangs that snap into the quick-release from aluminum cut from soft drink cans. The quick-release is a two-part lost-wax casting, but laminated sheet styrene also works well.



Fig. 7. Make tension adjustment loops for the shoulder belts from .018" stainless steel wire, solder the ends, let cool, and file the front flat.



The original art has been reduced about 50 percent and this PMT can now be further reduced photographically to produce the final negative film containing the scale faces.

FIG. 9 GAUGE FACES ON A PMT

this eye to the lap belt with a small piece of the same kind of cloth tape used for the lap belts, Fig. 4. The lap belts lock into the quick-release by means of metal tangs, Figs. 5 and 6. (The left buckle is left free when the driver is not present, but the quick-release is usually left attached to the right lap belt.) I make the tangs out of aluminum cut from soft drink cans. This metal cuts easily with scissors and can then be filed to the exact shape required.

The shoulder belts come next. They are made of cloth tape 2 scale inches wide and are slightly more complicated than the lap belts because each contains a tension adjustment loop or buckle. The upper portion of each shoulder belt usually carries a manufacturer's name; I make the names from dry-transfer lettering. The upper end of the lower portion of each belt passes through the tension adjustment loop or buckle and has a tang on the other end which locks into the quick-release. (The tangs on the shoulder belts are slightly smaller than those on the lap belt.)

Tension adjustment loops are easily made from .018" stainless steel wire

bent into a square "8," Fig. 7. Complete the job by soldering the wire ends and filing the top surface flat. Then cut a small piece of tape to represent the reinforcement sewn into each shoulder belt just below the tension adjustment loop and pass the lower end of each shoulder belt through its tang, Fig. 8.

Crotch straps are easy. I generally cut two pieces of tape 1 3/4 scale inches wide. They come from either the front edge of the seat or a slot cut in the seat. I do not make loops in the ends of the straps as this interferes with the way they lie on the seat.

The last item in the harness is the quick-release. I used to make these by laminating 2 1/2 scale inch discs of .040" styrene, then filing the plastic to shape. This worked well, but I've since prepared rubber molds so that I can make quick-releases using a lost-wax casting technique, Fig. 5. (I also use lost-wax castings for complex shoulder belt tension buckles.) Make the lever that releases all of the belts from styrene rod filed to shape or cast it along with the rest of the quick-release.

Modeling gauges. I have never been happy with dial faces made from decals.

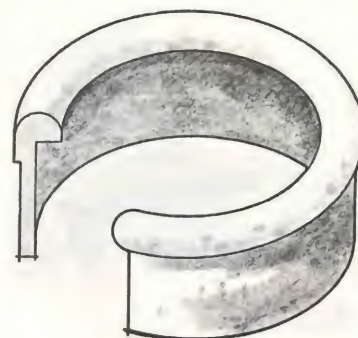


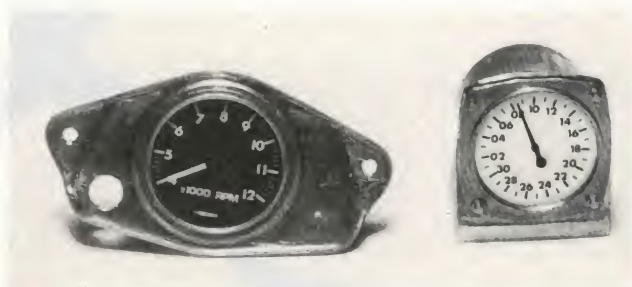
FIG. 10 BEZEL WITH INSIDE AND OUTSIDE SHOULDERS

The printing usually is not sharp enough for my taste and coating the decals with clear finishes to simulate glass covers isn't convincing — the finish is too irregular. I have found that making dial faces from photographic negatives and mounting them in scratchbuilt bezels produces excellent results.

With this technique you first draw a much-oversized dial face on paper and then shrink it down through photography to a negative of the correct scale. The negative becomes the dial face.

You must first decide how large you want your finished dial. Then scale up your artwork to an even multiple of the dimension so that you have a comfortable size to work in. Many professional artists prefer to work "two-up"; that is, their original is twice the size of the final art, but you may feel more comfortable with original art three or even four sizes up. Work on a good grade of white drawing paper with a permanent black ink. You may find dry-transfer lettering and lines a big help. Make sure you keep your lines thick enough and leave enough space between letters. I'll explain why this is important a little later on.

Take your inked drawing to a local photostat house (look in the Yellow Pages under "Copying and duplicating services"). Ask the camera operator for



(Left) Fig. 11. The dial faces are ready to be cut out and installed in these scratchbuilt mounts. (Above) Fig. 12. These gauges are ready for installation in a turbocharged Renault. Although aircraft usually have more instruments than race cars, the same techniques can be used to superdetail airplane cockpits.



Meet Paul Budzik

Married, with one son, 30-year-old Paul Budzik is a dentist in Fresno, California. He's been a modelbuilder since the age of four or five, and over the years has become quite expert at miniature machine work and making lost-wax castings, many of which he uses in his 1/12 scale race car models. His other hobbies include photography and O scale model railroading.

a line negative however many times smaller than the multiple you enlarged your artwork by.

If your original is very large, the photographer may have to go through two steps to shrink your drawings the desired amount. He will do this by making an intermediate photostat (which he may call a PMT, a photomechanical transfer) that will be partially reduced. When he shoots his final negative, he will take it down the rest of the way. I have found it economical to have a number of PMTs made; I paste these up into one large sheet containing enough dials for several cars. The photographer can then use this sheet to make

the final negative. Figure 9 contains eight gauge faces from a PMT: You can have these reduced to whatever scale you need for your model.

When the photographer shoots the final negative, he'll try to reproduce every line on the original. He does this by changing the exposure time. The length of the exposure changes the thickness of the lines in the final negative. If you used some extremely fine lines on your original, then, as he attempts to hold those lines, the other lines will become wider and the letters may start to blend together. The same will happen if you spaced the letters too closely.

If you spaced the lines correctly and chose proper line weights, you'll now have a black negative with clear areas for the numbers and indicators. If you want white dial faces and black numbers ask the photographer for a "film positive."

The next step is to paint the sheet on the emulsion (dull) side so that the numbers and indicators appear white or whatever color they should be. If you have a redline indicator or colored numbers, use a fine brush and carefully paint those areas. I then spray white lacquer over the entire back of the sheet. When the lacquer has dried, cut out individual dial faces.

Bezels. For maximum realism, I almost always mount dial faces behind brass or plexiglass bezels made on a lathe. I turn a ring of the desired diameter with an inside and outside shoulder, Fig. 10. The inside shoulder supports the dial face while the outside shoulder locates the dial face in its mount. Here's my procedure: I chuck a piece of rod stock and drill a hole in the end the size of the dial face. I then de-

velop the inside shoulder using a tool ground for inside turning. After this, I remove the end of the rod with a cutoff tool. I then turn down the end of the rod and press fit the cutoff portion onto the rod. In this way, I can finish the face of the bezel and develop the outside shoulder. I am now ready to glue or solder the bezel to its mount, which I've made from brass or plexiglass.

The next step is to turn a piece of clear plexiglass and press fit this into the back of the bezel; it supports the dial face and forms the rest of the gauge. Drill holes in the back of the plexiglass to accept any wire connections that will be visible on the completed model. Figures 11 and 12 of unassembled and assembled gauges should convince you that the photographic approach produces convincing scale instruments.

Other details. If the bodywork around the driver on your model is removable, you may want to include all sorts of additional details — switches, fuse box, and wiring harnesses are some of the possibilities. Most of the front suspension may be exposed when the bodywork is removed. In that case, pay special attention to spring and coil damper units, brake piping, and the rigging to the adjustable roll bar if there is one.

Other details include an oxygen bottle and its hose, Fig. 2, and the fire extinguishing system. (In case of fire, the driver, protected by a fireproof suit, breathes oxygen through the hose, while the fire extinguisher floods the cockpit with Halon gas.)

I also like to make operating universal joints for the steering system, Fig. 13. I machine these from aluminum and brass. Finally, if the pedals are visible, I hook up the appropriate cables.

As you've seen, superdetailing a race car cockpit doesn't require exotic tools or materials. It does call for patience and close attention to detail, but the results are worth every hour put into the project.

FSM

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- You may also want to check out an annual publication, *Autocourse: the Review of International Motor Sport*, published by Haymarket Press Ltd., 5 Winsley Street, London W1, to see if it has information on your car's equipment.
- The catalogs of mail-order racing equipment firms also contain numerous photos; one such catalog (\$2.50) is published by Auto World, 710 North Keyser, Scranton, PA 18508.



Fig. 13. Paul says that the universal joints in this 1/12 scale brass and aluminum steering assembly work perfectly, with no slop or binding.

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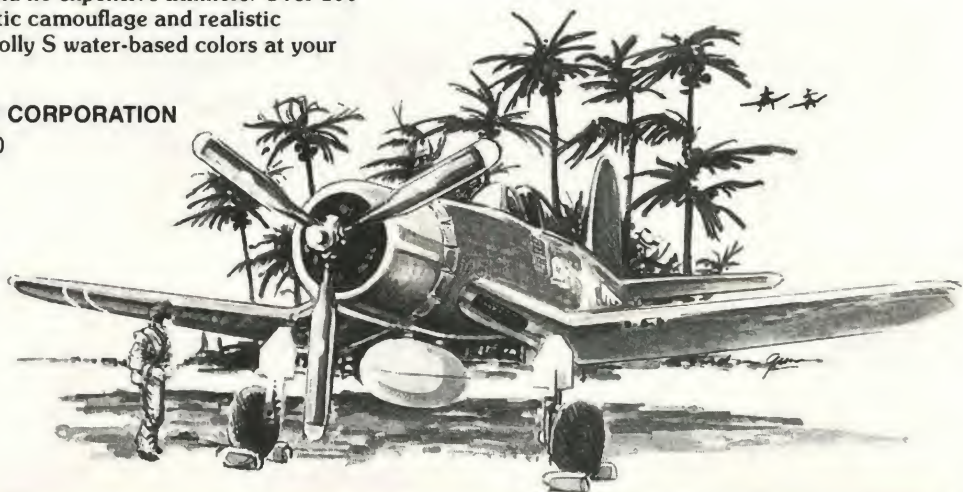
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A quiet moment in a hectic campaign: Two GIs and their reconnaissance jeep pause at a crossroads during the Allies' push across France after the 1944 Normandy invasion. The scale is 1/35, the jeep is Italeri, and the figures are from Tamiya.



Both photos, FINESCALE MODELER: A. L. Schmidt

The scene is small, just 7½" x 12", and the composition would work for dozens of similar scenes. It's a good starter project if you haven't tried your hand at diorama construction. The trim around the base is made from 5/8" quarter-round molding.

Building your first diorama

Basic techniques you can use to construct an attractive scene in just two or three evenings

BY BRUCE CULVER

DIORAMA construction is perhaps the easiest, most relaxing, and one of the most creative aspects of scale modeling, and yet many modelers run off screaming into the night when their friends admire their latest technically exquisite efforts in modeling and say "Gee, that (Sherman, Bf 109, Brewster Buffalo) would look even better in a diorama."

Diorama building is easy because, as Bill McClanahan pointed out almost 25 years ago in his popular book on model railroad scenery*, there is very little

problem in scaling natural objects. If you make a rock (or a tree, or a gully) a tad too big, it's simply a bigger rock (or a taller tree, or a deeper gully). Combining this natural leeway in "scale dimensions" with some simple shortcuts in using and applying natural materials allows anyone to construct a realistic diorama scene. You don't need a great deal of experience, special tools, or costly materials.

My diorama was built as simply and cheaply as possible; in fact, most of the materials were either "found" items or scrap. The few materials that I had to purchase were not expensive and will last a long time.

Titled "Under New Management," the small, 7½" x 12" scene was con-

structed in only three evenings. It represents an interlude during the Allied drive across France in the fall of 1944. A dusty reconnaissance jeep from a U. S. armored division has advanced to a minor road junction in territory formerly held by the Germans, and the two crewmen are waiting for the rest of their unit. The jeep, which is the reconnaissance "peep" described in my article in the Fall 1982 issue of FSM, pretty well chose the locale and date of the diorama for me, since it was weathered to represent a vehicle operating in northern France in 1944. The rest was easy.

Choosing a subject and a design.

Although this article shows one method and one set of materials to build one simple diorama, it is not intended to

*Scenery for Model Railroads, Kalmbach Publishing Co., Milwaukee, 1958. Revised edition 1967.



Figs. 1 and 2. After deciding how the diorama will be arranged, the first step is to sketch out the terrain on the base, a slab of ½" plywood (left). Next (right) come wafers of ½" Styrofoam packing

material from which the contoured scenery will be formed. Note the masking tape added to keep the edges of the base clean so that the molding could be applied later.



Color photos, FINESCALE MODELER: A. L. Schmidt

These three color close-ups show how well all the varied colors and textures of the diorama blend together. Note that all colors in the scene are subdued, and that the ground color has been worked onto the standing GI's boots and the jeep.



help only those who want to model two GIs and a jeep at a signpost. With a few minor changes, the same scene could portray two Germans and a Kübelwagen, two British soldiers and a Dingo scout car or CMP light truck, or a couple of German mechanics brewing ersatz coffee next to an Me 163B Komet sitting in a small wooded area.

Without the vegetation, much the same scene could show a couple of DAK reconnaissance types in the Libyan desert, or even a pair of Germans (or Russians) cooking a simple meal on snow-covered ground. The theme and subject are entirely up to you. The basic techniques for making the base, ground texture, and foliage are applicable to just about anything but at-sea naval scenes.

This article isn't meant to be a treatise on diorama design and composition (Shep Paine's book, *HOW TO BUILD DIORAMAS**, is), but I have three principles worth remembering when planning any scene. First, there should be something going on. That "something" doesn't have to be a grand event such as the liberation of Paris, but a viewer should be able to look at the diorama and tell you what's happening. (If he turns to you and says, "Those vehicles seem to be parked there," try again.)

Second, usually, there should be just one thing going on, a single center of interest. Otherwise, the various parts of the diorama tend to compete with each other for the viewer's attention. Third, it should be obvious that the scene has a "front," that is, that the scene is designed to be viewed from one or at most two angles, and there should not be objects obscuring the action from those viewing angles.

One of the best ways to start work on a diorama is to find a photo in a reference book that shows what you want to portray. If you don't have a definite picture of what you want, try a number of different arrangements with the models that you plan to use. Then, using the ½" plywood diorama sub-base and the models, roughly position the main elements, Fig. 1. Mark the positions of the models and all major scenic features with a pencil. Even when you've achieved a composition you think you like, try different arrangements. At this stage major alterations are easy to make; they get a lot harder later.

Forming Styrofoam scenery. The basic scenery shapes for my "Under New Management" were carved from Styrofoam packing material, the high-tech equivalent of orange crates. Although I've listened to modelers argue at length about the relative merits of different types of Styrofoam, any kind — from insulation, to packaging, to the crumbly variety that florists use — works

*How to Build Dioramas, Kalmbach Publishing Co., Milwaukee, 1980.



Fig. 3. Knives for cutting Styrofoam, from top to bottom: large serrated carving knife, small- and large-blade modeling knives, and a spoon-end serrated grapefruit knife.

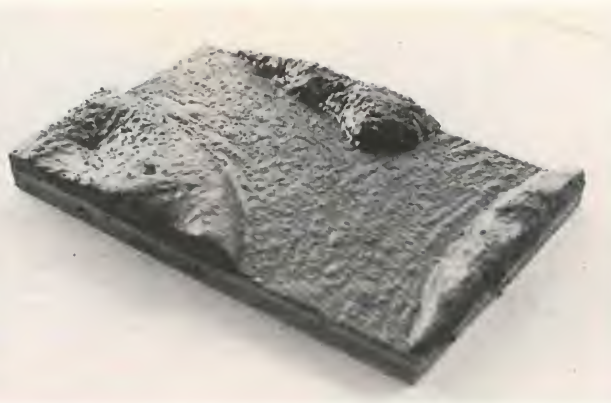
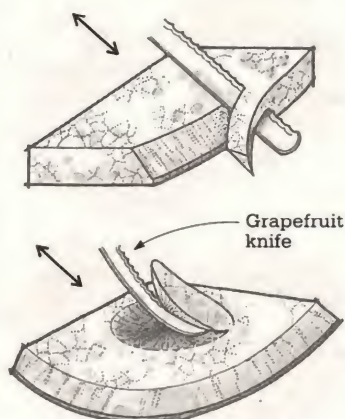


Fig. 6. After applying a "goop" primer that consists of white glue and dirt, the diorama base looks like this. Note that the hole for the tree was made before the base was primed.

FIG. 4 CARVING STYROFOAM

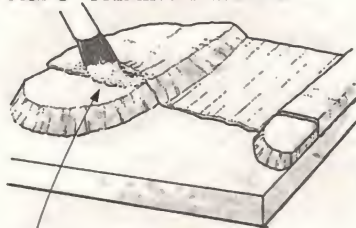


Carving hollow areas

fine. In fact, the stuff I used was packing from a table radio!

Figure 2 shows the three Styrofoam terrain pieces rough cut to shape. Sharp single-edge razor blades, hobby knives, or serrated kitchen knives will cut Styrofoam cleanly. Dull blades or knives will drag, causing the Styrofoam to

FIG. 5 PRIMING THE BASE



Glue-dirt mixture

flake and crumble uncontrollably. My favorite tools, Fig. 3, were a serrated carving knife and a grapefruit knife with a curve at the end.

Carving the Styrofoam, Fig. 4, took only 10 minutes for all three pieces. I used the serrated carving knife for most of the shaping. The grapefruit knife was used for carving the hollowed-out areas. To finish the basic shaping, carefully go over the terrain sections with coarse sandpaper to round off the edges.

The next step was to cement the shaped terrain pieces to the base with white glue. Virtually all solvent-based glues will melt Styrofoam because of its porous, low-density plastic structure, so use only water-base glue for fixing parts in place and priming. Protect the edges of the plywood base with masking tape so you will have a smooth surface for adding the molding to them later on, then cover your work surface with newspaper. The next step, priming the base with a mixture of dirt and glue, gets a bit messy.

Scenic "primer" — dirt and white glue! Prime the Styrofoam and the bare plywood with a mixture of sifted dirt and white glue, allowing the "goop" (there's no better word for it!) to fill in small flaws, but working it into large holes that you want to save, Fig. 5. An inexpensive 1" paintbrush is the best applicator. Besides sealing the porous surface of the foam, the goop also forms a fillet between it and the wood, blending the terrain into the flat areas, Fig. 6.

On the road areas I used heavy brush strokes to help create a rough, rutted appearance. The primer will level out a good deal, but will leave shallow ruts and hollows. If you want to model a smooth road, don't prime the flat plywood with goop; instead, use only the dry soil treatment described in the next step. If you want a very rough, deeply rutted road, build up ridges and humps with several layers of dirt and white glue goop. An even easier way is to laminate a thin ($\frac{1}{4}$ " or so) slab of Styrofoam to the road, then carve or crush it



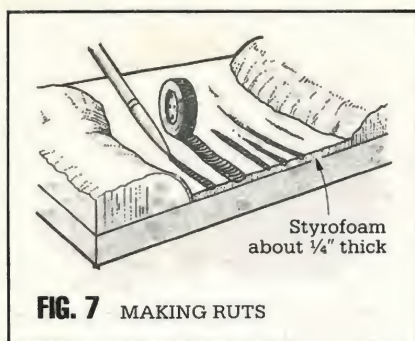


Fig. 8. The final dirt texture on the terrain and road surfaces is made by sprinkling sifted dirt over wet varnish. The road requires several applications.



Fig. 9. Assorted pieces of dried twigs (left) and roots from various weeds and plants (right) are ideal raw material for making large and small trees and bushes.



to make irregular contours and ruts, Fig. 7.

If lumps form in the priming coat, just let everything dry and sand down any large unwanted lumps. Then brush on a second coat of goop to fill in the defects. If something doesn't look the way you want it, just keep reworking the area until you like the effect.

Next, dry soil and varnish. When the goop is dry, apply a basic covering of dry soil. I used a spray can of satin-finish polyurethane varnish, but any spray varnish that remains wet for two or three minutes after application will work. Spray an area, sprinkle on sifted dirt, and work the loose dirt into the wet varnish areas with an old paint-

brush. Don't rub or stipple too hard.

When you've covered the varnish with dirt, shake off the excess, spray an adjacent area with varnish, and sprinkle on more dirt. Continue until you have an even coating of dry dirt over the whole diorama, Fig. 8. Shake and blow off excess dirt, but don't try to brush the surface at this stage. To achieve the look of hard-packed dirt on the road, I repeated the varnish-and-dirt treatment five or six times on that portion only.

Adding vegetation. With the dirt base in place, the next step is to add the foliage, grass, and tree. Applying all of the various foliage materials took between 30 minutes and an hour. The trick here is to find miniature copies of

the plants and grasses you want to model. There are all sorts of things you can use, and most can be found in local fields and in your supermarket.

The large bare-limbed tree is part of a hackberry bush I found a mile from my house. It has excellent "miniature" bark, but there are dozens of other shrubs, bushes, small plants, and plant roots that duplicate the basic shapes of different trees, Fig. 9.

After trimming away its not-to-scale leaves, I was able to twist the trimmed hackberry cutting to make the tree more balanced — this works only with fresh, "green" cuttings. Since old, dying trees often have interesting shapes — and little foliage — I opted to model a decrepit old tree.

What few wisps of foliage there are on the tree were attached with small dabs of white glue, Fig. 10. I used green ground foam rubber from the hobby shop for living leaves, and appropriated some chopped oregano to represent dead ones.

A raid on the spice cabinet. Ordinary dried and chopped spices are among the most realistic materials you can use to simulate plants. They're also easy to obtain. While cooks choose spices for their flavor, usually I pick a spice for appearance only, Fig. 11.

After gluing the tree into its hole with white glue, I applied the assorted ground cover textures I had gathered: chopped dillweed and fine ground foam (for grass), and chopped oregano (again, for dead leaves). I started by spraying the dry soil with flat varnish, then sprinkled on the dillweed and foam. When the "grass" looked good, I sprayed on more varnish and sprinkled on the oregano "leaves," then resprayed lightly with the varnish to fix the oregano in place. After giving the varnish a few minutes to dry I shook off the excess texture material, saving it for future use, Fig. 12.

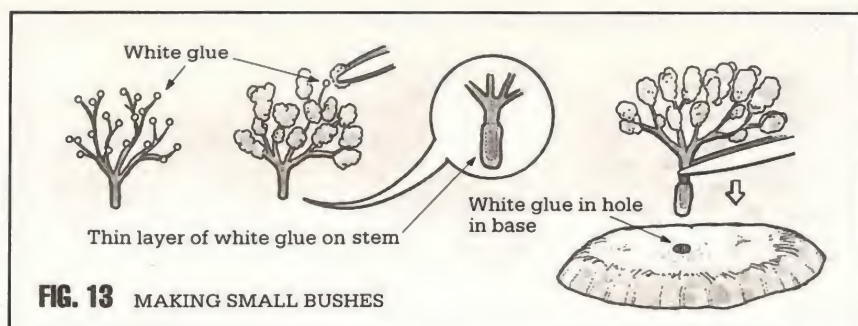
The small bushes were made from gnarled shrub roots with clumps of com-



Fig. 11. Among the materials used for foliage on the diorama were (left to right) oregano, dillweed, seed heads from tall grass, and commercial green ground foam texture material.

Fig. 12. The scene begins to come to life with the addition of the large dead tree (a hackberry twig) and the post for the German signs. The dead leaves at the side of the road (more oregano leaves) are an easy-to-do touch of realism.





mercial green foam foliage. I added them to the diorama by punching small holes in the Styrofoam base and cementing the stems into the holes with white glue, Fig. 13.

The signpost and signs. All of the signs on the post at the road junction are German, and that's the tip-off that this real estate is "Under New Management." The signpost is a length of

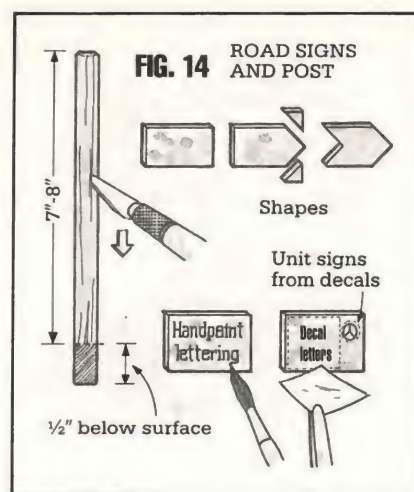
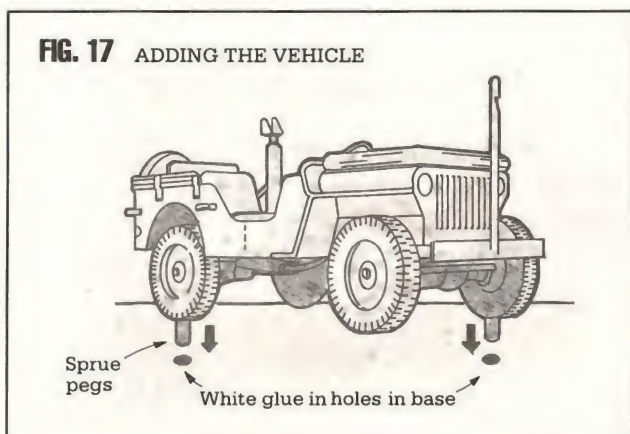
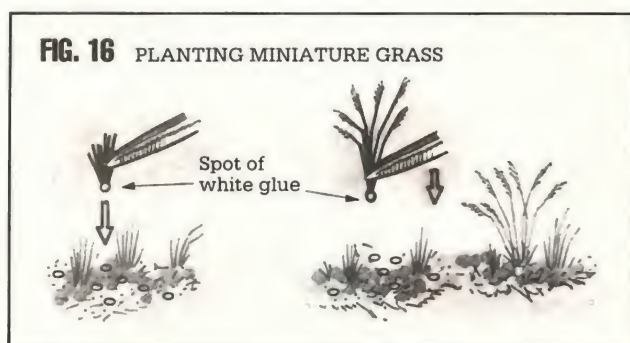
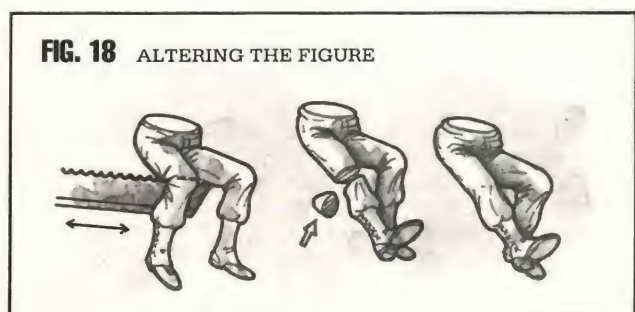


Fig. 15. An afternoon stroll through an overgrown field yielded several varieties of convincing tall grass for 1/35 scale.



FINESCALE MODELER: A. L. Schmidt

All the signs on the post are German, but the left-behind helmet and the "at ease" poses of the two GIs are further evidence that the enemy has recently given up this patch of real estate.



1/4" dowel that had been outdoors for several months. Its gray, weathered appearance can be simulated by boiling a new dowel in water for an hour, soaking it for another hour to open the grain, scribing in cracks with a knife, and painting the wood with a heavy wash of dark gray, Fig. 14.

The German unit direction signs were hand-painted on shapes cut from 1/32" basswood. Many WWII German signs were stenciled, so you can use decals or dry transfers to make neater printed signs and unit or tactical signs. Be sure to weather the backs of the signs before cementing them to the post.

To finish the base I added several small clumps of tall grass around the signpost, tree trunk, and other places in the scene. Here again I used a natural material, individual strands from the seed heads of tall grass, Fig. 15. Using tweezers, I stripped tufts of the dried weed away from the stem and cemented them in small clumps. Use a small dot of white glue on the base of each clump, Fig. 16.

Completing the scene. After adding a canvas windshield cover and cementing the windshield of the jeep in the lowered position, I cemented 3/32" diameter plastic pegs (made from sprue) to the bottom of the left front and right rear wheels, Fig. 17, then pushed the pegs into holes drilled into the base, cementing them with white glue.

The figures are from the crew of the Tamiya M3A2. Both were converted to fit the story line. The right leg of the seated figure was cut off at the knee and straightened by inserting a wedge of thick sprue, Fig. 18, and the standing figure was built with alternate arms to hold the carbine (from the Italeri jeep kit) and a stretched-sprue cigarette.

I prefer muted colors for uniforms anyway, so the figures were relatively easy to paint. The trousers are brown, field jackets are light olive green, shirts brown, leggings light olive or tan, and web gear khaki (olive) green, and I added just a little shading to accentuate details.

After painting the figures I dusted them with the same sifted dirt used on the diorama base and oversprayed each with flat finish. This dusting helps the figures blend in with the scenic base and look "at home." When the varnish dried, I cemented the figures in place with white glue, adding bits of grass and leaves around the feet of the standing figure. The final touch was the hand-lettered "Reg Stab I" sign on the back of the jeep.

That's all there is to it. While this small vignette really serves only to show off a handful of easy techniques, once you've built one small diorama there are literally thousands of combinations of vehicles, figures, terrain, foliage, and climate you'll be ready to tackle.

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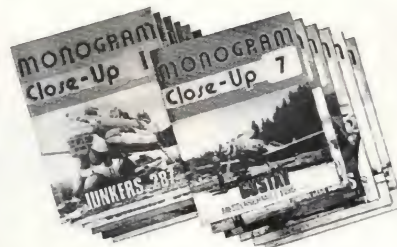
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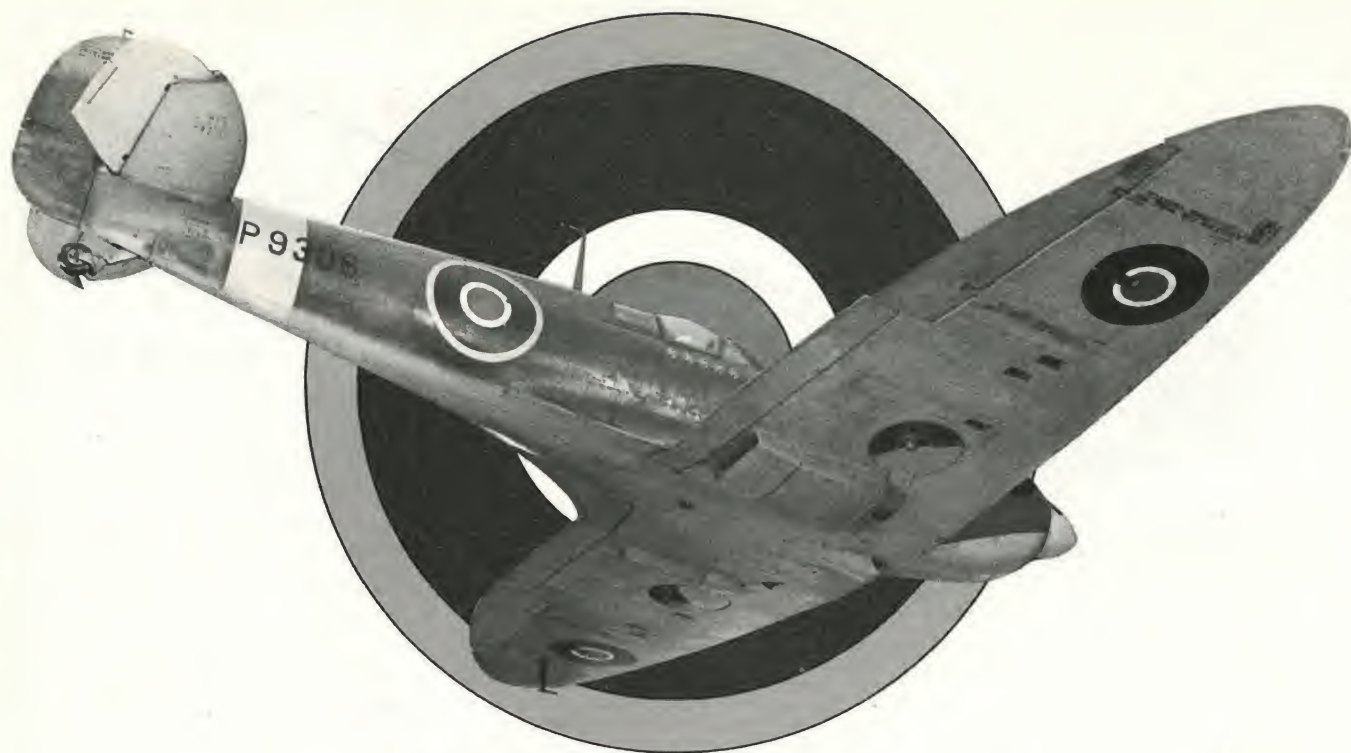
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Research data: SUPERMARINE SPITFIRE MK. IA P9306

Color schemes and markings for a Battle of Britain warbird from manufacturer to museum

BY KEN SOMMERFIELD
ARTWORK BY THE AUTHOR

ON SEPTEMBER 19, 1944, British Information Services presented a Spitfire Mk. IA to the Museum of Science and Industry in Chicago, Illinois, and the plane has been on display there ever since. The museum's Spitfire had survived four years of active duty in the Royal Air Force and had undergone every major markings change that affected RAF day fighters during World War Two: It had worn seven sets of markings. I envisioned painting a series of airbrushed watercolor renderings of the Spitfire Mk. IA, each slightly different from the others, but all with one common marking—the black serial number P9306. The paintings would provide reference data for a collection of seven models representing the entire history of P9306. What an interesting conversation piece that would make!

The plane today. The plane, as I found it in the museum, carries the

standard day fighter scheme of Dark Green/Ocean Grey/Medium Sea Grey that was authorized after August 15, 1941. The national insignia have been retained, but there are no unit markings. There are, however, five German kill marks along the starboard side of the cockpit; I hoped to trace the origin of each. This, then, represents the final color scheme worn by P9306. Now I had to find out what the others were.

Research. Information about Spitfire color schemes proved to be readily available. For example, the book *Camouflage and Markings: R. A. F. Fighter Command, Northern Europe, 1936 to 1945* gives a concise description of all Spitfire markings throughout WWII. *British Aviation Colours of World War Two*, a collection of Air Ministry orders about markings and color schemes, was also helpful.

My next job was to find out what the

plane's unit markings were, those that were applied at squadron level. This is where the job got tough! Time and circumstance have ways of making records disappear, and in the case of Spitfire P9306, many details were never recorded in the first place.

Neither I nor any of those who helped with this project found any wartime photos of P9306, though we did find photos of several aircraft belonging to the same units that P9306 was assigned to. These photos provided information about the size and position of the code letters on the museum aircraft. I obtained two-letter squadron codes from the book *Squadron Codes, 1937-56*, but the third letter, the aircraft letter assigned to each plane in a squadron, was apparently never recorded for P9306 in any of its four unit assignments. For this reason, none of the paintings except Fig. 6 shows an air-



Both photos, Chicago Museum of Science and Industry

The Spitfire Mk. IA in the Chicago Museum of Science and Industry was a gift from the people of Great Britain. Ken's research into its past took more than a year but provided him with enough information to paint ten airbrushed watercolor renderings that show the plane at each stage of its career with the RAF.

craft letter on the fuselage. In Fig. 6, the letter "H" shows the position the letter would occupy. There is no evidence that any personal markings or emblems were ever applied to P9306.

Next I tried to learn the history of those kill marks. For this, I relied upon the assistance of a true gentleman, Wing Commander F. F. Lambert, DSO, DFC, CD (R), who visited the Public Record Office in London and searched through the Operations Record Books for both combat units that P9306 had been assigned to. He then cross-checked the dates of combat activity listed in the Operations Record Books with the combat descriptions written up in the separate volumes of Combat Reports. After months of work, Wing Cdr. Lambert and I knew the exact dates of the first two of the five kills and the most likely period of the other three.

Before describing the operational his-

tory and markings of P9306, I'd like to mention that I contacted several organizations when I started to research this aircraft. Of course, I began with the Museum of Science and Industry, but I also wrote to the Royal Air Force Museum, the Imperial War Museum, the Ministry of Defence, and the Public Record Office, all in London. Each letter was answered cordially and each correspondent gave as much information as he could. No single agency had everything I needed to complete the project. Here is a point worth remembering if you plan to do similar research: Allow plenty of time. I had hoped to research P9306 in three or four months—the project took more than a year!

P9306's early career. Despite nagging gaps in its history, I salvaged enough information to piece together P9306's past. The plane was built by



Meet Ken Sommerfield

Ken Sommerfield attended the Chicago Academy of Fine Arts and is now a free-lance commercial artist in Princeton, Illinois. He's married and has one son. At 43, Ken has been building scale model aircraft for about 15 years; his models show the same attention to detail that is so evident in his illustrations. He belongs to the Experimental Aircraft Association and has made paintings of several fellow members' airplanes. He's also interested in photography, which he uses as a tool when researching aircraft.

For assistance in preparing this article, Ken thanks all of the institutions mentioned in the text and offers special thanks to F. F. Lambert, J. S. Fowler, E. A. Munday, and D. M. Greenwood.

Vickers-Armstrongs at the Woolston Works late in 1939 and was one of 35 aircraft in Serial Batch P9305-9339. The RAF received the fighter on January 20, 1940, and sent it two days later to reserve storage at No. 24 Maintenance Unit (MU). Over the next five months, P9306 was subsequently transferred to No. 4 MU and No. 6 MU. Finally, it was assigned to active duty on July 6, 1940, and joined 74 Squadron at Hornchurch. Upon arrival, its factory-applied fuselage roundels (35", Type B) were obsolete for service aircraft, and were changed to the 35" Type A.1 roundel with the 7" red spot, Figs. 1, 2, 3, and 4.

Also, the fin flash of 7"-wide stripes was added, as were the squadron codes, done in letters 24" high, 16" wide, with 4"-wide strokes. The codes were painted a light gray conforming to reference DTD 33B/157. The undersurface color had to be changed also, but it's unlikely that this was done right away as the maintenance shops were busy replacing all de Havilland two-speed props with the constant-speed type. Also, 74 Squadron was in the midst of the Battle of Britain, and P9306 was quickly put to work; four days after it arrived, it was flown by Pilot Officer Stevenson who shot down one Messerschmitt Bf 109 and damaged another.

It can be assumed that by the end of July the plane's underside was correctly painted all Sky. The upper sur-



Fig. 1. Production color scheme for upper surfaces, Dark Green/Dark Earth. Pattern A. Type B roundels of 56" diameter.

ALL DRAWINGS 1/48 SCALE

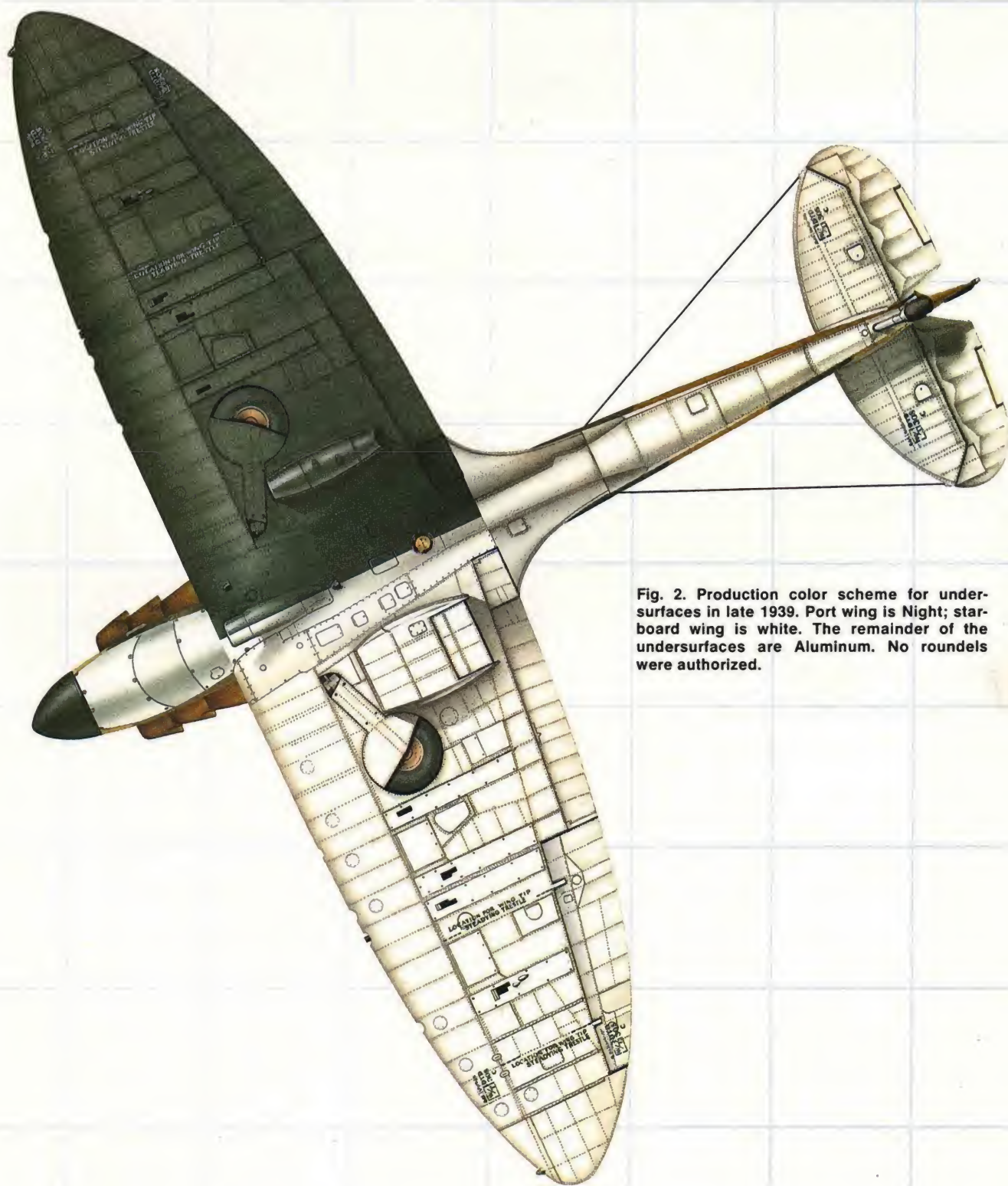
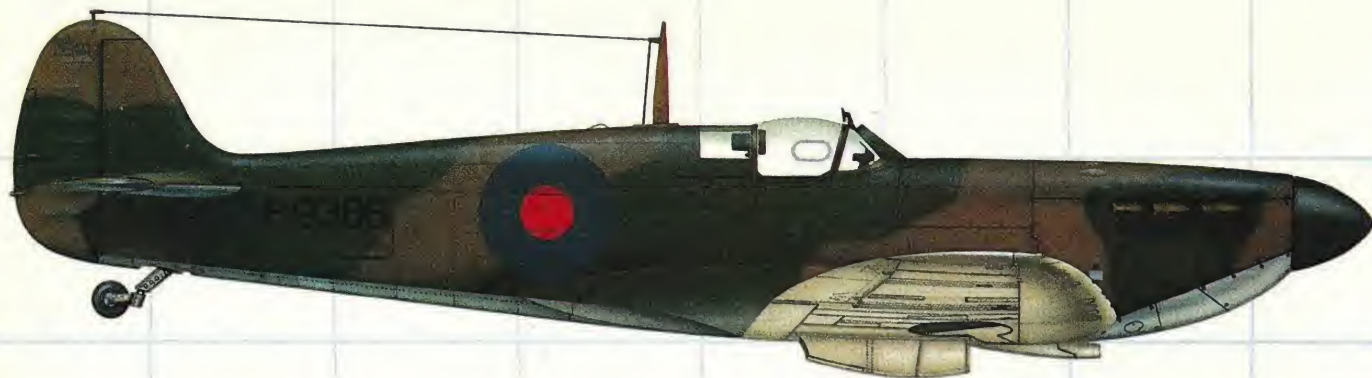


Fig. 2. Production color scheme for undersurfaces in late 1939. Port wing is Night; starboard wing is white. The remainder of the undersurfaces are Aluminum. No roundels were authorized.



Figs. 3 and 4. Side views showing the position and sizes of the serial number and Type B roundels of 35" diameter. No other markings were applied at this time except for the maintenance stenciling common to all aircraft.



face colors of Dark Green/Dark Earth (Pattern A) remained as the factory had applied them, Fig. 5. No underwing roundels were applied until after August 11, 1940, and then they were Type A, 50" diameter. The fin flash required an alteration as of August 1; it became three 8" stripes 27" high. A second kill mark, Fig. 6, was added on August 11 when Sergeant Kirk destroyed a Messerschmitt Bf 110 36 miles east of Harwich at 4,000 feet.

There were no changes in markings during September and October. Although the fighter was frequently engaged in combat interceptions, no kills were recorded. On September 20, 1940, records indicate that P9306 incurred damage requiring it to be sent to 45 MU for repairs. The nature of the damage is not known, nor is it known how long the plane was out of action.

At the end of November 1940, another change in markings took place, Fig. 7, when the spinner was painted Sky, as was an 18"-wide fuselage band. The underside of the port wing was

painted Night up to the fuselage center line and the underwing roundel on that side was encircled with a 5"-wide yellow band. (The band was not painted on the aileron.) This scheme was used until April 22, 1941, at which time the black wing was again repainted Sky. Judging from the activities of 74 Squadron through the closing months of 1940, it is possible that P9306 scored its final three kills during November and December — the squadron accounted for 26 enemy aircraft in November, and 12 more in December.

In early 1941, 74 Squadron's combat activities took on an offensive nature and were carried out with newer Mk. IIs; P9306 and other Mk. Is were fast becoming obsolete as first-line weapons. On July 17, 1941, P9306 was transferred to 131 Squadron then forming up at Ouston. With this reassignment came a change in fuselage letter codes from ZP to NX. All other markings remained the same, and it is certain that P9306 now carried five kill marks. The fighter saw no combat during its short

stay with 131 Squadron, but served as a training aircraft for new pilots joining the unit. Records indicate that many of them were Belgian.

A major color scheme change took place while P9306 was with 131 Squadron. After August 15, 1941, the day fighter camouflage changed to Dark Green/Ocean Grey on top, and Medium Sea Grey undersides. The fuselage codes remained 24" high but were now Sky. On the leading edge of each wing was a 4"-wide yellow identification stripe that ran from mid-wing to wing tip. In the process of repainting, the color patterns changed slightly from what they had been when green and brown, and the boundary between upper and lower fuselage colors behind the wing became a soft edge rather than a hard line, Fig. 8.

With the Operational Training Units. On October 22, 1941, P9306 was once again transferred, this time to 52 Operational Training Unit (OTU) at Aston Down. Its chances for combat were slim but it wore another set of letter codes, GK, 24" high. Even though the OTUs



Fig. 5. Appearance at the end of July 1940. Type A.1 roundels of 35" diameter with 7" red centers. Fin flash was three stripes, each 7" wide. Gray squadron code letters 24" high, 16" wide with 4" strokes, and a 2" separation between letters. The kill mark was approximately 3" square. Red tapes were applied over gun ports to keep out dust and prevent gun malfunction. All Sky undersides.



Fig. 6. Appearance at the end of August 1940. Fin flash altered to three 8"-wide stripes 27" high. Type A roundels of 50" diameter had been added to both Sky underwings. A second kill mark has been applied.

were essentially noncombat units, and much larger than normal fighter squadrons, they did have an on-call status and were expected to go into combat if needed. So, the aircraft in OTUs looked like those of the regular day fighter squadrons.

While with 52 OTU, the Spitfire underwent another markings change on May 21, 1942, involving the fuselage and wing roundels and the fin flash. The fin flash became two stripes each 11" wide by 24" high separated by a white stripe 2" wide by 24" high. The fuselage roundels changed to Type C.1, 36" in diameter, and the underwing roundels were Type C, 32" diameter. The upper wing roundels' dimensions were unchanged, but their red center spots were darkened from the previous somewhat bright red to a muted, brick red. This new dull red was also used in the other roundels and the fin flash. These revised national markings would stay with the plane for the rest of its active duty, Fig. 9.

Little is known of the plane's activities while with 52 OTU, but in March

1943, it was again damaged to the extent that it was shipped to Westland Aircraft for repair. As with the first accident, the records do not indicate the type of the damage nor the cause of it, but the aircraft, as it now appears in the museum, shows signs of having been repaired in the fuselage beneath the cockpit door and in the adjoining wing fillet panels. In addition, the fuselage fuel tank cover forward of the windshield appears to have been badly ripped, then welded shut and painted over. Finally, the exhaust manifolds have been replaced by the fishtail type that was more common to the Mk. V Spitfire. Apparently, after the repairs P9306 was transferred again, on May 4, 1943, this time to 61 OTU, Fig. 10.

With the Maintenance Units. With only a change of unit letter codes, the aging fighter experienced its last markings variation. In January 1944, P9306 was withdrawn from active duty and sent first to No. 29 Maintenance Unit, then on to No. 52 MU at Cardiff, Wales. At this last storage facility it was allo-

cated to the museum on August 26, 1944, and arrived in Chicago September 19.

P9306's importance to me. When viewing the plane in the museum, it's easy to pass it off as just another anonymous warbird, one in a parade of planes that were frequently destroyed within days of being built. Yes, they were expendable. But this one survived. It was there when the Heinkel He 111s made their runs across the English Channel. It struck fear in the hearts of rear gunners trapped in outclassed Bf 110s. It was flown by such names as Malan, Mungo-Park, Stevenson, and Brzezina. It was not the personal aircraft of any one pilot, but was kept ready for any pilot on call when the order to scramble was given — in the summer of 1940, that happened a lot!

In the course of tracing the history of this aircraft, I've developed a certain kinship with P9306. It has been part of the enjoyment that I've gotten out of this project, and it has helped to ease the frustration that set in when I could not unearth all the misplaced or unre-



Fig. 7. Appearance at the end of November 1940. Port wing underside painted Night up to fuselage center line (see Fig. 2). Spinner was now Sky, as is an 18"-wide band around the rear fuselage. The underwing roundel has been outlined with a 5" yellow band giving the roundel an overall diameter of 60". The yellow band, however, did not extend into the aileron.

corded details about the plane. I hope that modelers will have as much fun using this reference material as I had gathering it!

FSM

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Fig. 9. Appearance after May 21, 1942. Fuselage roundels changed to Type C.1 of 36" diameter. Underwing roundels were now Type C, 32" diameter, and the upper wing roundels remained unchanged except that the red centers were dulled to a brick red. The brick red is used in all other red markings, including the fin flash, which was now two stripes 11" wide separated by a white stripe 2" wide by 24" high.

Fig. 10. Appearance in May 1943. Except for a change in unit letter codes, all markings remained as in Fig. 9. Fishtail exhaust manifolds had been installed. Repaired and painted panels and generally scruffy appearance indicate that the plane had encountered recent hard use.



Fig. 8. Appearance after August 15, 1941. Upper surface camouflage was now Dark Green/Ocean Grey with Medium Sea Grey underneath. The division between upper and lower colors along the rear fuselage was now a soft edge rather than a hard line. Letter codes remained 24" x 16" but were now Sky along with the spinner and fuselage band. The wing leading edges showed yellow identification stripes 4" wide running from midway along the wing out-board to the tips.



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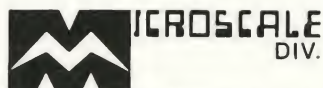
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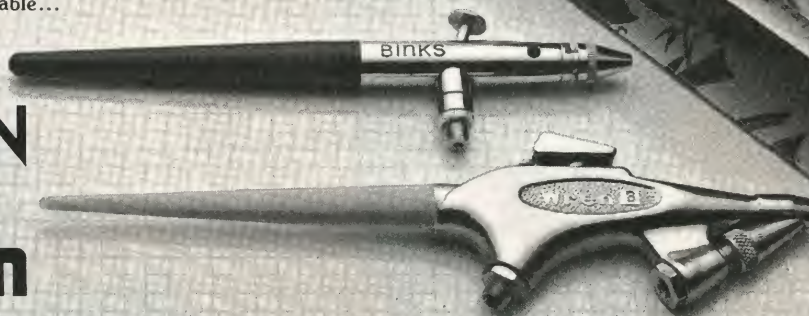
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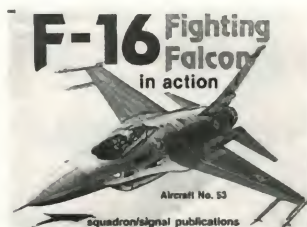
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The book is published by Squadron/Signal Publications, 1115 Crowley Drive, Carrollton, TX 75006, and sells for \$8.95.



F-16 Fighting Falcon in Action

Lou Drendel has written and illustrated this 50-page, 8¼" x 11", horizontal format, soft-cover book about the General Dynamics F-16. The book contains 92 black-and-white photos, 7 color paintings, and many drawings of aircraft details. In addition to a brief report on the fighter's development and production history, Drendel includes an interview with General Dynamics' Director of Flight Test, Phil Oestricher, and his own account of a flight in the rear seat of an F-16B.

The book is published by Squadron/Signal Publications; it sells for \$4.95.



F-5E & F Tiger II in Detail & Scale

The most recent of Bert Kinzey's *Detail & Scale* books, this 72-page, 8½" x 11", soft-cover volume concentrates on the F-5E and F versions of the Northrop lightweight fighter, especially the planes flown by U. S. Air Force aggressor pilots in simulated combat with Air Force fighters. The book contains 136 black-and-white photos, 35 color photos, 1/72 scale five-view drawings, and many sketches of aircraft details. A modeler's section provides kit and decal reviews.

The price is \$6.95; enclose \$1.00 for postage and handling if the book is ordered directly from Aero Publishers, Inc., 329 West Aviation Road, Fallbrook, CA 92028.



SB2C Helldiver in Action

The Curtiss SB2C Helldiver had a troubled development but eventually became a mainstay of U. S. Navy carrier dive bombing units in WWII; a few remained in service with the French into the 1950s. This 50-page, 8¼" x 11", horizontal format, soft-cover book by Robert Stern with illustrations by Don Greer contains 118 black-and-white photos, 10 color paintings, and many detail drawings that show Helldivers from the first prototype XSB2C-1 through the SB2C-5E, with brief mention of the XSB2C-6 and the XSB3C-1.

It is published by Squadron/Signal Publications and sells for \$4.95.

Photography for the Scalemodeller

First published in Australia in 1975 and reprinted in 1978 by Drake Publishers, Inc., 801 Second Avenue, New York, NY 10017, this is a 79-page, 7½" x 10½", hard-cover book with 95 black-and-white photos and 18 drawings. The price is \$8.95.

The author, Pieter Stroethoff, is a commercial photographer and builder of plastic scale models, particularly aircraft. After a brief introduction to the philosophy of scale model photography, he discusses the best types of cameras, lights, filters, and films, and shows

how to mount models on sheets of plate glass or in front of mirrors to achieve special effects. Although the author also discusses larger cameras, his photos make it clear that an inexpensive 35 mm SLR usually works well — careful posing of the model and control of the lighting are more important than fancy equipment.

How to Build, Customize & Design Plastic Models

This is a 182-page, 5½" x 8¼", soft-cover book (\$10.95) from Tab Books, Inc., Blue Ridge Summit, PA 17214, by Theron L. Gordon with 121 black-and-white photos (many poorly focused) and 2 drawings. It is meant to be a beginner's guide to building plastic models. However, the text is infuriatingly vague. For example, we're told that a knife is a "Very basic tool, used constantly. The heavy duty knife is used strictly for cutting thick plastic, such as cutting a part in half. The medium duty knife is used in removing parts from trees and some carving. The light duty knife is used for shaping and trimming just about any tight, low-pressure work." There are no photos of the knives being discussed nor any mention of brand names. We're also told that "there are two main brands of plastic model glue, Pactra and Testors."

Six Armies in Normandy

This is a 365-page, 6" x 9", hard-cover book with 43 photos and 8 maps by John Keegan, a lecturer at the Royal Military Academy at Sandhurst. Keegan first briefly discusses Allied planning for the invasion of Normandy on June 6, 1944, as well as German defensive preparations. Later chapters cover the paratroop landings of the U. S. 82nd and 101st Airborne Divisions, the Canadian assault at Juno Beach, German defenses and counterattacks, the battle for Caen, the activities of General Maczek's Polish 1st Armoured Division in the Battle of the Falaise Pocket, and the role of Charles de Gaulle and French resistance units in the liberation of Paris.

The combat descriptions are excellent, especially those concerning actions by individual soldiers and small units. Many could provide subjects for interesting dioramas.

The book is published by the Viking Press, 625 Madison Avenue, New York, NY 10022; the price is \$17.95.

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tions; it provides an excellent introduction to working with fiberglass for new construction and for repairs. Tools, materials, safe working practices, mold making, and laminating techniques are covered thoroughly. The how-to chapters include simple practice projects to help the reader become familiar with such techniques as laying up fiberglass laminates with epoxy or polyester resins. A glossary and a list of suppliers' addresses make the book even more useful.

It is published by Tab Books, Inc.; the price is \$10.95.



P-51 Mustang in Color

Author Larry Davis and artist Don Greer have collaborated to produce this 30-page, 8 1/2" x 11", soft-cover book with 46 black-and-white photos, 7 color photos, and 14 pages of color paintings containing four-view renderings, color schemes, and detail parts on the P-51A, P-51B, and P-51D. Two pages of color paintings show F-82 details and color schemes.

The book is published by Squadron/Signal Publications and sells for \$5.95.



The Complete Book of Cockpits

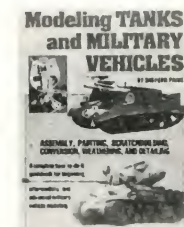
Don Dwiggins' latest volume from Tab Books, Inc., is a 232-page, 8 1/2" x 11", hard-cover book containing 360 black-and-white photos, 23 color photos, and 19 drawings. It sells for \$39.95. The text discusses the history of aircraft instrumentation, while most of the photos are close-up shots of cockpit interiors. American homebuilt and general aviation aircraft are covered in the

most detail, though many U. S. commercial and military airplanes of all eras are treated as well, and there are even two color photos each of a Messerschmitt Bf 109G cockpit and an Me 262 cockpit. The result is a fascinating, loosely organized compendium of text and photos by an author who loves the subject. The book should be especially valuable to those who superdetail model aircraft cockpits and should be invaluable to those who model contemporary U. S. homebuilts—where else could you find a photo of the instrument panel on the Cook JC-1 Challenger?



Museum and Display Aircraft of the United States

This soft-cover, 8 1/2" x 11", 76-page book by Bruce William Orriss is a list of all aircraft known to be held by museums in the United States. The names and addresses of museums owning one or more aircraft are given, as is a description of each plane's condition and display status. An index of aircraft is included and 206 black-and-white photos of planes of all eras add to the interest. Published in 1976, it is available for \$4.95 from the American Aviation Historical Society, P. O. Box 99, Garden Grove, CA 92642.



Modeling Tanks and Military Vehicles

This 76-page, 8 1/4" x 11 1/4", soft-cover book by Sheperd Paine tells how to build armor models. There are 226 photos (19 in color) and 49 drawings.

Shep first discusses basic kit assembly and painting and then progresses to kit conversions, weathering, detailing, and scratchbuilding. Three step-by-step chapters present four modeling projects: two easy kit conversions involving truck-mounted guns, converting an M4 Sherman into an Israeli Isherman, and building a U. S. M25 tank transporter.

The book is published by Kalmbach Publishing Co., 1027 North Seventh Street, Milwaukee, WI 53233; the price is \$8.95 plus \$.75 for postage and handling (\$1.25 for foreign orders).

Mystery Bomber of World War II

The LADY BE GOOD



The Lady Be Good

In this reprint of the 1962 edition, Dennis E. McClendon re-creates the history of an Air Corps B-24D (serial No. 41-24301) that disappeared on April 4, 1943, during its first combat mission. The plane had taken off from Soluch, Libya, for a bombing raid on Naples and was scheduled to return that evening. No trace of the plane was found until November 9, 1958, when a British oil geologist sighted a B-24 in the Libyan desert 440 miles south of Soluch. McClendon tells how the plane was identified as the *Lady Be Good*, why its inexperienced crew mistakenly flew so far beyond their base, and how the remains of eight of the nine crewmen were eventually found as far as 60 miles from the wreckage.

Although there are no drawings, this 208-page, 5½" x 8¼", hard-cover book (12 pages of photos) should be useful to any modeler interested in building a diorama of the *Lady Be Good*.

It is published by Aero Publishers, Inc., 329 Aviation Road, Fallbrook, CA 92028; the price is \$13.95. **FSM**

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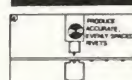
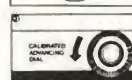
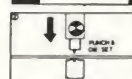
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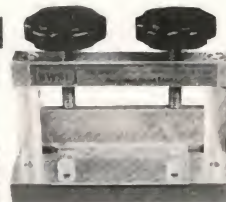
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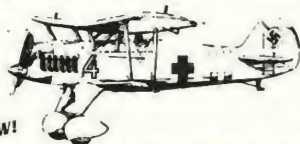
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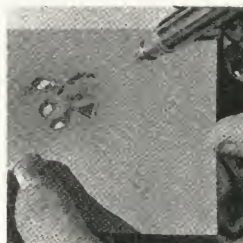
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Two camouflage tips are shown here:



1. Using a mask as shown, spray through the openings, move the mask over the next area to be sprayed. Hold the mask at least 1/2" from surface for a soft edge effect.



2. Another way to achieve the mottled effect is by free-hand spraying. Set the spray width to fine and hold the air-brush close to the surface using tight, erratic hand motions.

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TABLE OF CONTENTS

- | | | |
|--|---|---|
| 1. Basic kit assembly | 6. Step-by-step:
Two easy kit
conversions | 9. Step-by-step:
The Super
Sherman |
| 2. Painting armor
models | 7. Detailing and
superdetailing | 10. Battle damage |
| 3. Weathering | 8. Modeling extra
gear and
equipment | 11. Building from
scratch |
| 4. Reference and
research | | 12. Step-by-step:
An M25 tank
transporter |
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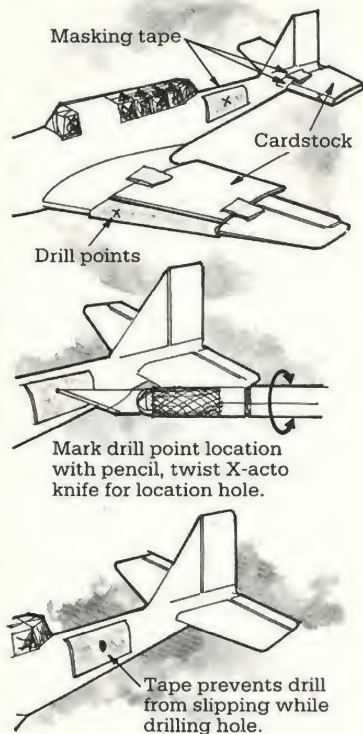
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Protect surfaces when drilling. When installing wheels, struts, antennas, machine guns, and similar parts on a nearly completed model, be careful to prevent damage when drilling their mounting holes. The drawing shows what I do. First, I tape thin sections of cardboard (cereal box thickness) to all parts of the model that could be damaged by a slipped drill. Next, I apply pieces of masking tape directly over the hole locations. I mark the hole locations with a soft lead pencil and then carefully twist the tip of an X-acto blade into each marked location. Twisting the blade makes a pinpoint-size hole in the tape that serves as a drill guide, so that the drill can't slip.

Applying the cardboard and tape does take some effort, but I'd rather do the job right the first time than have to spend even more time repairing and repainting damaged sections of the model.

E. Richard Staszak

Lead foil. Make straps for tanks and trucks from pieces of the thin lead foil used to cover corks on wine bottles. The foil can be cut with scissors and rolled to any thickness desired; it's much easier to paint and handle than paper.

Jim Gillen

Colored translucent plastic for wing tip lights. Makit & Bakit styrene beads (as described in the Fall 1982 FSM) can be used to create translucent wing tip and formation lights for model aircraft in any scale. I make a rectangular mold about 1" x 4" x 1/4" deep from a double layer of aluminum foil, pour in the colored beads, and bake in the oven at 325° for 25 to 30 minutes. After cooling, the result is a colored translucent sheet of plastic that can be shaped with a knife, saw, file, or sandpaper.

After cutting a mounting hole into the wing, I glue the light in place with Crazy Glue and file and sand it flush with the wing's surface. The light can then be polished out with toothpaste and masked for painting. The results are quite eye-catching.

Phil Hays

Metallic markers. I have found something in my local art store that has turned out to be quite a help in finishing my model cars. It's called a metallic marker. The markers are made by Niji and Pilot, come in silver, gold, and copper, and broad or fine points. The ink is permanent. They cost about \$2.50.

I use the markers to highlight small chrome trim on my model cars and

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trucks; they're much neater than brushes.

As far as the metallic quality of the ink, it falls somewhere between the silver paints I use and Bare Metal Foil.

Brian O'Leary

Extra-large sandpaper. In the Fall 1982 FSM, Alan C. Griffith asked where he could buy sheets of sandpaper larger than 9" x 11". If he checks the Yellow Pages under "Abrasives," he'll find that he can purchase just about any size and grit of paper or cloth that he needs. For example, here in North Long Beach, California, a company makes sanding belts and sells any length you want. You cut to individual requirements.

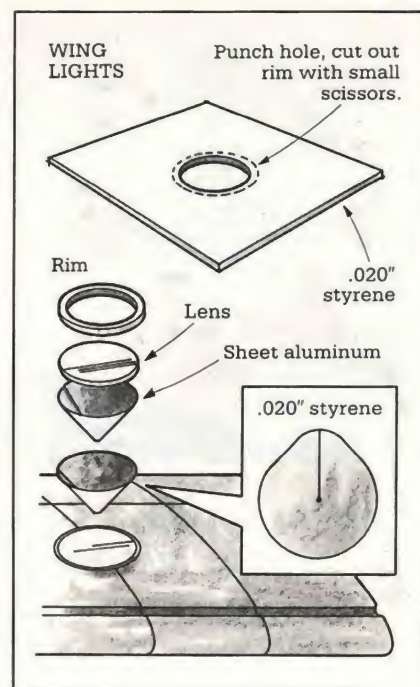
Wayne A. Denny

Wing lights. Here's a handy way to make realistic wing lights with reflectors. You'll need a single-hole paper punch, small scissors, scrap .020" styrene sheet, clear acetate, aluminum sheet cut from a disposable pie pan or frozen food container, 5-minute epoxy, and liquid plastic cement.

Step 1. Use the paper punch to make a hole in the .020" styrene, then cut around the edge of the hole to form the rim.

Step 2. Make a receptacle by cutting out an egg-shaped piece of .020" styrene slightly larger than the rim. Make a single cut from the narrow end to the center. Shape the piece into a cone and glue the overlapping edges with liquid plastic cement. Sand the top of the cone until it fits snugly against the rim.

Step 3. Make a reflector by repeating step 2, but this time use unwrinkled



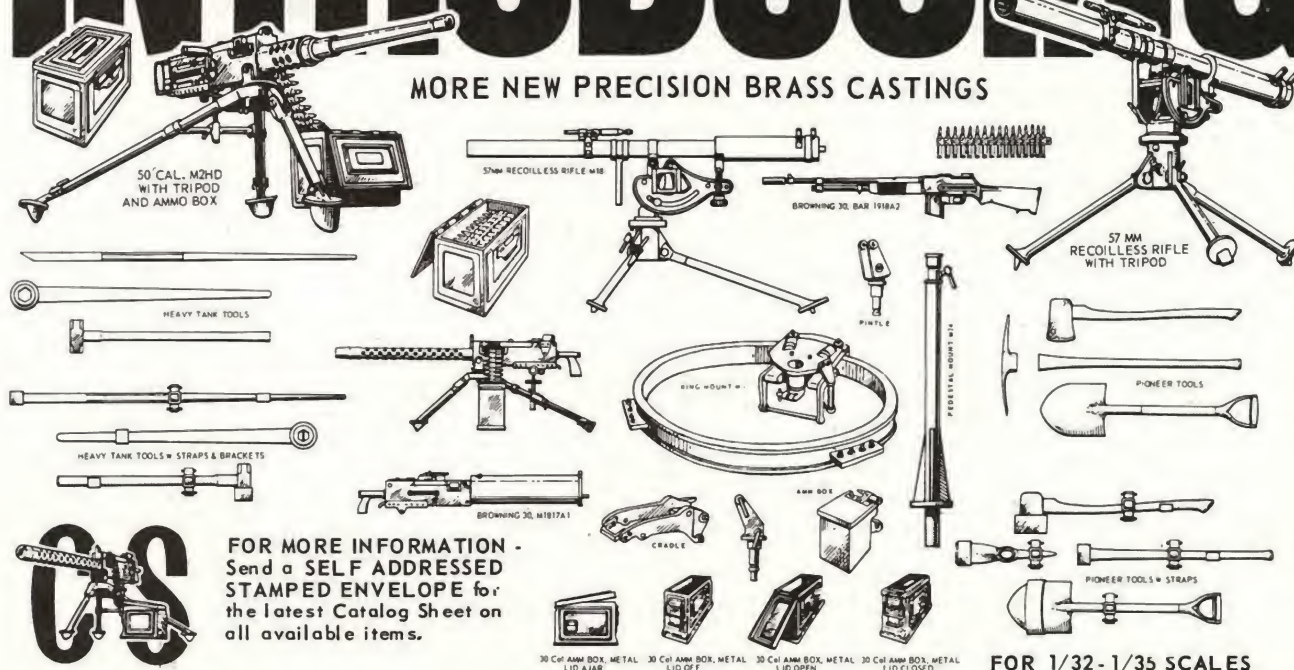
aluminum sheet from a disposable pie pan or frozen food container. (Ordinary aluminum foil is too flimsy.) Attach the reflector to the receptacle with a drop of 5-minute epoxy.

Step 4. Punch a lens from clear acetate and glue it to the rim with 5-minute epoxy.

Ron Lowry

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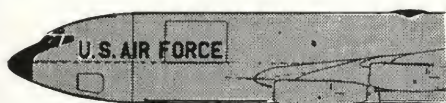
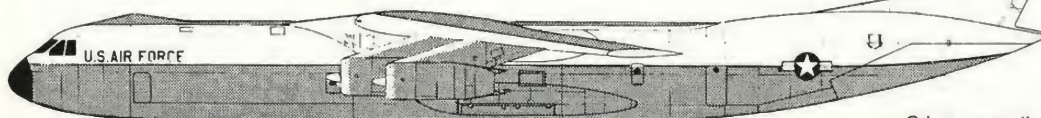
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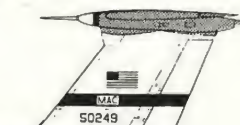
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Nail buffer. I've found that a chamois nail buffer is well suited to several modeling tasks. It is a good scratch remover on unpainted plastic, even on clear parts, and is much less messy than a polish. Another application is to give a flat finish a worn, weathered sheen. Light buffing will give a shiny, almost oily appearance to flat paints. This is very effective on the hoods of armored vehicles, the upper surfaces of aircraft, and even the helmets of miniature figures. Areas around raised details stay flat and thus stand out. This also works well on instrument panels first painted white, then black, and buffed to bring out the raised white dials.

Dave Orloff

Loss prevention. Place sprue trees containing small parts inside a plastic sandwich or food storage bag and cut through the bag to remove the parts from the sprue. The bag allows you to see the parts being trimmed, but prevents the pieces from flying across the room and hiding in the carpet.

If you must work in a room with shag carpeting, spread newspaper over the carpet so that you'll at least have a chance of finding dropped parts.

Bruce Culver

Watercolor tray. A watercolor tray with several small compartments is useful for sorting and storing small parts during assembly.

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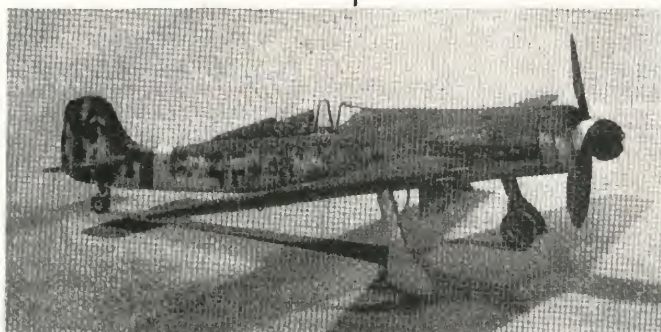
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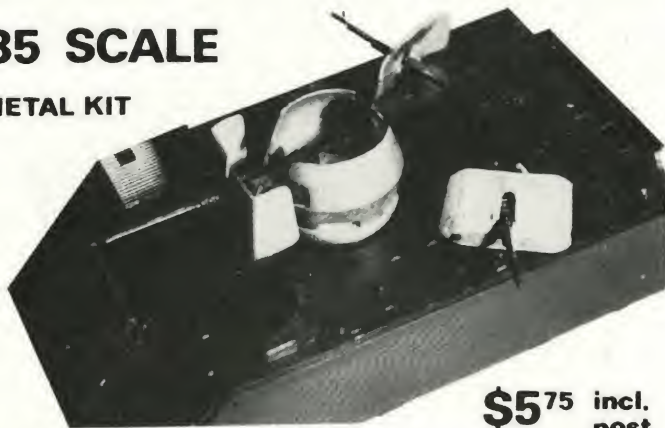
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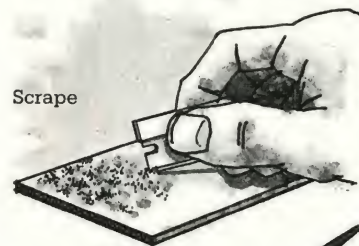
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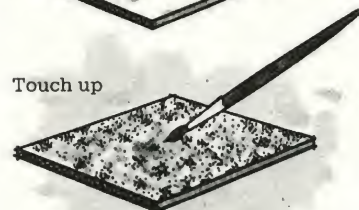
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Paint



Scrape



Touch up

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Practice on a piece of scrap and you'll soon get the hang of it. The grass is perfect for 1/48 to 1/32 scale, and although the work is painstaking, I find it rewarding.

Troy Borgerson

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Burr Angle

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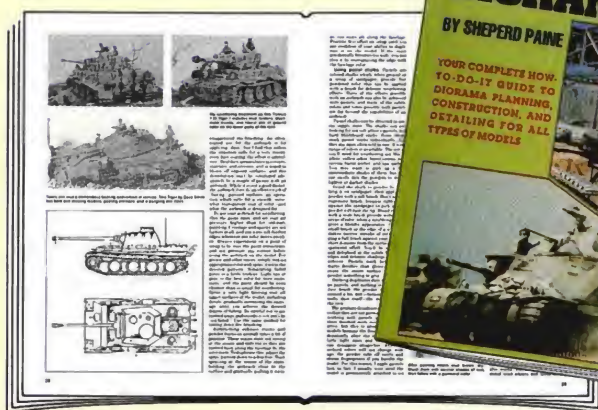
A	
A P C Hobbies	50
Archer's Hobby World	70
Aztex Corporation	4
B	
Badger Air Brush	66
Battle Hobbies	5
Binks Manufacturing Company	60
Bliss Marine	6
Bowsprit, Inc.	50
John W. Burns	62
C	
Cal-Scale	69
Castolite	5
Clover House	5
Combat Models	28
Combat Series	69
Cush	64
D	
D & J Hobby & Craft	63
Robert DeMaio	65
E	
Empire-Pacific Ltd.	71

Evergreen Scale Models	5
F	
1st Armored Model Supply Company	7
FineScale Modeler	17, 21
Floquil-Polly S Corp.	44
G	
G H Q Models	44
Gateway Hobbies	72
Grandt Line Products	62
R. M. Groene & Co.	13
H	
Harold's Place	37
R. H. Hebner Distributing Co.	62
Hugh's Aviation Prints	19
I	
IPMSUSA	71
J	
JMC/Con-Cor	9
K	
Kalmbach Publishing Co.	10, 67, 75
A. Kempees	7
Kit Collector's Clearinghouse	62
L	
LST Products	12
Lencraft	5
M	
Microscale Decals	60
Minicraft Models	61
Meta Models	37
Mitchell Products	4
Model Car Masterpieces	2
Model Rectifier Corp.	76
Modeler's Discount Hobby Shop	63

The Model Works	4
Monogram Aviation Publications	51
N	
New England Custom Hobbies	20
New Jersey Hobbies	65
Northwest Short Line	65
P	
The Plastic Place	37
Precision Manufacturing Co.	70
R	
R. V. F. Hobby Imports	20
Repla-Tech International	5
S	
Scale Aircraft Modelling	68
Scale Model Research	64
Scientific Models	43
The Spare Time Hobby Shop	71
Squadron Mail Order	15, 51
Strete Hobbies	20
T	
299 Models	5
Tenax 7R	62
V	
Vintage Castings	65
W	
W.R.W. Imports	8
Waldron Model Products	63
Walthers	16
War Eagle, Inc.	72
Weapons & Warfare Quarterly	64
Williams Brothers	12
Wings 48 & Wings 72	66
Woodland Scenics	7

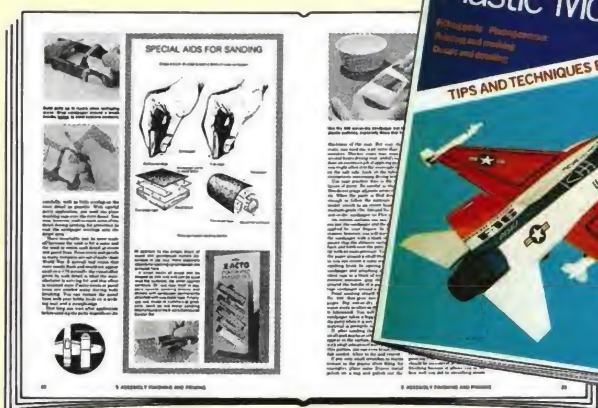
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